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The Farmer's Digest

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Grass Cuts Their Milk Costs

Condensed From Successful Farming

Niemen Hoveland

A WISCONSIN dairyman wrapped up in one short sentence a lot of wisdom gained from years of experience.

"With *good* roughage," he said, "you can produce cheap milk." The speaker was Louis Wojtkiewicz, a successful farmer in Clark County, Wisconsin.

There's a bit more to it than that, of course. Good cattle, good feeding, herd management, labor-saving methods are also important factors.

But Louie hammers home that point of *good* roughage—good in quality, yield and soil building. And it must be efficiently handled. He's found that here's the very key to low cost milk production. Excellent grain crops then follow almost automatically. And with high protein roughage and some grain, plus water, you have the makings of milk.

Louie doesn't know R. J. Stapledon, the famous British pasture authority. But if the two ever meet, they'll get along fine, as men whose thinking runs along the same lines. Stapledon has delivered these carefully clipped comments:

"The cheapest feed for stock is forage.

"The cheapest manure for the soil is grass.

"The cheapest tillers and drainers of the soil are the roots of grass."

To which Louis might reply: "That's right, R. J. Just any kind of grass won't do, though—have to have legumes in there. I'll take my alfalfa-bromegrass-ladino mixture." He keeps 60 per cent of his plowland in that—three years of grass in a five year rotation.

If some farmers find that cheers for grass have a hollow ring—if reference to sod as "manure" is puzzling—it's usually because they're thinking of stringy bluegrass on worn out hills. Not enough farmers so far have learned to do as good a job with grass as they've been doing for years with corn and oats.

There is reason to believe that the effect of today's growing know-how will be to use the "manuring" value of deep rooted leg-

Reprinted by permission from Successful Farming
Des Moines, Iowa, December, 1951 Issue

ume sod to obtain almost as much corn and small grain as before. But more cheaply and from fewer acres.

Take a close look at some striking feed-yield figures the University of Wisconsin is uncovering. H. L. Ahlgren sparkplugs the investigation.

The study is primarily pasture research, but also has turned up some evidence on dairy farm crop rotations and on the "manuring" value of alfalfa-bromegrass left seeded down for four years in a six year rotation.

Here's the pay-off development: Permanent bluegrass produced a total of only 5.7 tons of forage per acre during the last five years for which returns are in. But the long alfalfa-brome rotation produced 7.9 tons of better forage plus 17.4 tons of corn silage and 71 bushels of oats during the same five years on the same kind of land!

Grass doesn't make the soil richer in everything and won't eliminate the need for fertilizer, but the priceless value of keeping land in legume-grass mixtures for several years is that they add organic matter. This in turn gives the soil a good texture and breaks down to supply nitrogen. That stimulates the yield of the following crops.

Ahlgren emphasizes that alfalfa and bromegrass, with or without ladino, offers the advantage of what he calls "flexibility in use." It's good for hay, pasture and silage, so you can harvest it as need requires without waste. As p a s t u r e, it's even flexible enough so that you can let it get away from the cows in the spring. They'll still f i n d it palatable enough to eat the accumulated growth during summer drouth. Bluegrass never was like that!

How to get the most from pasture? Another Wisconsin farmer, Tom Stolen — who's located at Cottage Grove, nearly 200 miles southeast of Louie Wojtkiewicz— has it down pat.

"Very few farmers have *enough* pasture," says Tom. He wants his cows to be able to wrap their tongues around the grass, come drouth or not. So he has plenty of alfalfa-brome acreage — some of it renovated pasture on the rougher land, and the rest on 50 per cent of his plowland as the result of a four year rotation.

Second, he wants that grassland rich. He limes when soil tests call for it, and puts on unusually large quantities of phosphate and potash—as much as the equivalent of 600 to 900 pounds of 0-20-20 in rotation. As a result, he's doubled hay and pasture yields. "I can make out better by buying fertilizer for my land than by purchasing protein, minerals or any other feed for my cows," he says.

Third, Stolen has at least three

pastures and grazes them in rotation. "The grass never has a chance under continuous grazing," he says.

Years ago, before Tom Stolen caught on to all this, his herd used to go down to four cans of milk a day in summer. Now it seldom gets below 10, never below eight. That's partly because he's increased his milking herd from 18 to 25, but mostly because the animals now fill up easily on those lush pastures.

Because he agrees with Wojtkiewicz about the importance of *good* roughage, Tom is very careful about putting up hay. He always cuts late in the day, because he figures the leaves burn off if you cut in the morning. He puts it up the next day, or sometimes two days later on the June cutting. He often hauls hay at night when there's a little dew on, to keep from losing those leaves that are so high in protein.

For a foolproof way of saving the feeding value of hay, consider grass silage. Louie Wojtkiewicz puts up part of his crop that way. He has the equipment to do it, too—a field chopper, two power-unloading chopped forage wagons, and a blower. That makes light work of handling heavy silage, and fast work of getting hay in ahead of rain.

Now, for some advanced ideas on saving *both* work and feeding value—as well as the energy of cows—we'll do well to call on Morgan Jorgensen of Neenah, in eastern Wisconsin. He has about 90 Guernseys, and sells his bottled milk in Neenah and Menasha.

Jorgensen is a grass farmer, sure enough. He uses wilt-resistant Ranger alfalfa to make seedings last as long as possible, and plows only when the alfalfa is gone. Then he generally doesn't bother with corn, but jumps right to a crop of mixed oats and wheat plus grass seeding. Besides alfalfa, the seeding contains bromegrass, alsike and sweet clover.

Jorgensen has a giant, concrete lined trench silo 112 feet long, 16 feet high, 18 feed wide at the bottom, and 24 feet wide at the top. It holds as much as four large upright silos, but cost only a fraction as much. The June cutting of alfalfa goes into this silo without a preservative.

For harvesting grass silage, Jorgensen uses a field chopper which loads into a dump truck. For fast, easy and economical unloading, he says you just can't beat a dump truck and trench silo!

The job of getting silage out of the trench is mechanized, too. This man bores into it with a scoop on the manure loader of a tractor, speeds the load to outdoor feed bunks,and dumps it.

Incidentally, Jorgensen says outdoor bunks get around one

of the principal objections to pen barns—the fact that you generally have to use twice the normal amount of bedding to keep the cows clean. That's not true when you use outdoor bunks, he says. That's because the cows are in the barn only to lie down — and around the bunks you can clean up quickly with a manure loader.

Jorgensen's most radical practice is this: He uses the same feeding system in summer as well as winter! He hasn't had pasture (except a plot that lasts only a few days) for 10 years, and he doesn't want any. "Cows just run their milk off on pasture," he says.

Most dairymen would argue with him on that, where *good* pasture is concerned. But actually, Jorgensen has the same idea as the good-pasture enthusiasts, except that he carries it a step further.

Although pasture generally is considered the most economical of all feeds, Jorgensen can come about as close as anyone to matching it with his grass silage handled with field chopper, dump truck and manure loader. He does, of course, feed some dry, second-cutting hay in addition, plus a grain ration with the low amount of 15 per cent protein.

It's noticeable that although Wojtkiewicz, Stolen and Jorgensen live several counties apart and use somewhat different methods, all base their dairy economies on outstanding crops of grass—that is, alfalfa and bromegrass.

Pastures

A fertilized pasture is almost as good as a barbed wire fence. The cows don't like to leave that luscious green feed.

* * * *

Clippings made from fertilized and unfertilized plots on a johnson-grass pasture in De Witt County, Texas, showed that the application of one sack of ammonium nitrate per acre increased the yield of hay from 600 pounds to 2,100 pounds per acre.

* * * *

Nitrogen helps rid fields of wild garlic, say Purdue university agronomists. They recommend top dressing with 75 to 150 pounds of actual nitrogen 10 to 12 days before spraying with 2,4-D. Nitrogen stimulates the garlic plants and probably makes it easier for the 2,4-D to kill them. The nitrogen makes the garlic bulb rot faster and likewise boosts the cultivated crop yield.

Don't Buy a "Fooler Farm"

How to Buy Land That Will Pay a Profit

By Herb Boddy

Condensed From Western Dairy Journal

SO YOU want to buy land for a dairy farm? And your goal is contented cows, lush pasture, lots of milk and butterfat, plus spanking profits.

Well, you will find the maxim 'Don't buy a pig in a poke" as potent a tip today as ever. Smart land purchasers simply don't take much stock in "You get what you pay for."

Our country's list of "fooler farms" is a long and costly one. Too many of us are dollar-wise and land-foolish. We put price ahead of quality. It's a fact that much good land is underpriced, while poorer land values are overpriced.

Practical - minded farmers say the best land is worth every dollar you pay for it—within reason, of course. For as a rule, the better the land, the higher the yields and profits over the long pull.

Bankers Are Good Judges

The Federal Land Bank people are shrewd judges of land. Recently, their Spokane, Washington, office reported that 99 per cent of the loans on first class land were paid up on or before their due date. Only 20 per cent of loans to owners of poorer lands were redeemed on time.

It's easy to get stung in buying land. Even good-looking land can fool you—it's like picking out a book by its cover.

All sorts of things can happen if you fall for a "fooler farm." Maybe the land won't produce the kind of crops you want. It could cost too much to put in top working order. There's the chance that the land might have too little or too much water. You might find that those good-looking soils are really shallow and not nearly as fertile as they were cracked up to be. Those are some of the pitfalls of land buying today.

More and more farmland buyers are asking how to select land. And is there a safe, sure way?

Land Facts for the Asking

For the answers, we looked up Dr. Stanley W. Cosby, regional

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soils scientist in the Pacific Regional Office of the Soil Conservation Service, Portland, Oregon. Dr. Cosby has spent most of 30 years working with soils and farmers.

He agrees that it's easy to catch land buyers napping, but he says there is a wealth of land facts they can get for the asking—facts that will help a lot in sidetracking "fooler farms."

Here are the best bets on Dr. Cosby's list:

Soil survey maps worked out by state experiment stations in cooperation with the USDA. The maps show the kind of soils on a land site and note the facts about them. Much of the land in the country has been charted in this way.

Land capability maps prepared by Soil Conservation Service technicians cover an increasing area of farmland in soil conservation districts. They sum up the main uses of the land, the best crops to put in, soil and water problems, plus the practices needed to meet them. About half the land in soil conservation districts has been mapped so far—around 20 million acres.

Other Safe Bets

If there is neither a soil survey map nor land capability map handy, Dr. Cosby suggests that buyers contact the county agent or farm advisor, or local SCS staff members. Other good sources are the soil specialists of state experiment stations. In the end, the land purchaser may have to tackle the land-appraising job himself.

Most land purchasers lay their plans before an accredited, responsible real estate broker. From long experience in working with farm buyers, brokers are qualified to counsel and guide them on land sales. Many real estate men are using such technical materials as soil survey and land capability maps in servicing clients and advising buyers. In some cases they even call attention to these in their newspaper property ads.

Soil survey maps, for example, look a lot like huge jig-saw puzzles. But they are really quite easy to read. County agents are the ones to see about technical points.

Land capability maps, Dr. Cosby says, are especially helpful in appraising individual farms.

He says, "Each acre must be judged for the job it is to do. That's a must if we are to make farmlands last and return peak profits.

Know the Facts

"The first step in checking the capability of a piece of land is to know the facts about the soils, the slope of the land, the amount and kind of erosion and the climate. We should eye other land features, too. It may be rocky, subject to overflow or need drain-

age.

"We can build up our soil by adding fertilizer, organic matter or lime. We can clear trees, stumps or sagebrush from raw land. Rough, hummocky land can be leveled. Some of the elements used up by crops, or removed by leaching, can be put back, but even though we do all this, we can't change the kind of soil, the slope of the land much or the climate. And, there is no low-cost practical way to restore top soil once it has washed away.

"Today's land buyers will find such land capability maps a good guide. For they include most of the land facts which should be bared before any acreage deal is closed. Land capability maps contain data on soil, slope, erosion and other land and water features. They classify land, too—acre by acre—as to its capability for intensive cultivation, periodic cultivation, grazing, forestry or wild life. Most land capability maps, scaled at eight inches to the mile, are large and plainly printed. Technicians will be glad to answer questions about them."

They Know Values

Dr. Cosby says it will pay any prospective farmland buyer to drop in and talk over his plans with the county agent or the SCS technician in his area. Even though soil or land capability maps may not have been worked out on an acreage, it's a good bet the agent or soil technician can give a pretty good idea of its value. It won't be an acre-by-acre inventory of the land's worth, but it will be close enough to sidestep many a "fooler farm." They largely base their thinking on the capability and productiveness of neighboring lands.

Let's say you have to judge that dairyland yourself. And we'll say that you know a thing or two about soils and farming. You're not fresh off Main Street, that is. What do you look for?

"A shallow soil," says Dr. Cosby, "which rests on tight clay, gravelly, or drouthy layers is not as productive as a deep one. You can't beat good, deep soils.

"For this reason, it's a good idea to look deep into the soil with an auger or spade at several spots over the entire acreage. Keep in mind that the tops and ridges and hills are generally shallower than soil in valley bottoms. You can get a good cross-section of the profile from near-by road cuts, cellar walls and excavations. But, a word of caution. These soil 'measuring-sticks' shouldn't be banked on completely. Soils change in a matter of feet.

Fertility Indicators

"Another thing to watch in sizing up soil depths is the location of roots. The way they spread and fan out is a good indicator of the soil's fertility, its water storage capacity, and depth

of soil breathing."

The soil scientist also says buyers should see if underlying soil materials are spotted and mottled with rusty red or gray patches. Such signs point to poor aeration and generally, a wet, unhealthy condition. Observe the color and tilth of the surface soils. Dark, granular soil is best and has the right amount of organic matter.

"Buyers are told to check the lay of the land and note if the grade of slope will pose a tillage problem, or whether its steepness will call for special soil or water conservation practices such as terraces, strip-cropping or waterways. Look for erosion scars and other damage which can be charged to poor land use. And watch for signs of alkali."

Visit the Neighbors

It's a good idea to visit neighboring landowners. Usually these farmers can give a frank, off-the-cuff appraisal of farm values in their community. If there is land for sale near their farmstead, they'll know its talking-points.

"Finally," says Dr. Cosby, "take a close view of surrounding farms and the neighborhood and community. Are they prosperous and forward-looking? Has the present owner profited well enough to keep the place in good running order? Is the farm well-tailored, spic and span?"

For a parting word to land buyers, he sums things up this way: "A fellow shouldn't buy a piece of land unless he can profit from his investment and hard labor." Most land purchasers see things that way, too.

Hens Lay Eggs the Hard Way — Hens, as you may have noticed, lay their eggs the hard way—broad end first. Why they do this is anybody's guess, including two British scientists who recently tried to discover the reason for the hen's eccentricity. In their experiments, the two scientists, researchers in the anatomy department of Cambridge university, got themselves a hen, trained an X-ray camera on her, and settled back to wait. Pretty soon the camera revealed an egg—arranged efficiently, the narrow end first. But, about an hour before it was laid, the egg mysteriously turned around inside the hen. The scientists have been unable to explain why the egg should reverse its axis. The hen had no comment. *Farm and Ranch News*

New Technique for Water Well Drilling

Condensed From the Kentucky Farmer

IN A RECENT demonstration a 61 foot water well was drilled, cased, piped and pumped in a total elapsed time of 125 minutes. Three men utilizing a new drilling technique accomplished this feat on a Virginia estate near Washington, D. C., before an audience of military observers, representatives of government agencies and many other interested persons.

This remarkable demonstration was made possible by several companies, who formed a combination unit which consists of a 4 - wheel - drive one - ton truck, a special rig, and 5-foot sections of lightweight plastic casing.

Once the site of the new well has been determined, the hole is drilled to sufficient depth by means of augers. Several sections of casing are quickly joined and attached to a special perforated well screen that has an expendable bit on one end. The screen and casing then are lowered manually into the hole part way until the top section of casing extends approximately two feet above ground level. A rotary driving rod consisting of 5-foot sections is lowered into the casing and connected to the bit on lowered end of screen. Subsequently, a length of casing is slipped over the driving rod and joined by means of cemented sleeve to the casing extending above ground level. Driving rod is then attached to the power source and screen and casing are "pushed" into the well approximately five feet. The expendable bit's reaming action cleans out the hole and reopens it in the event of collapse. This same procedure is repeated by adding new sections of casing and rotary driving rod until the screen reaches well bottom.

After the well is cased, the driving rod is disconnected from the bit and pulled out. Lengths of flexible or rigid plastic pipe then are lowered into the well, and a pump is attached. Rigid pipes in 10 - foot lengths were joined by cemented sleeves. Cement used for casing and pipe joints sets in two minutes to permit lowering of new section into well.

The new well drilling equipment can penetrate shale, slate, sandstone and limestone, but it is not suitable for drilling through solid hard rock. In several preliminary drilling experiments with this packaged unit rig, wells almost 100 feet deep were drilled in less than 2 hours.

Reprinted from the Kentucky Farmer
Louisville, Kentucky, March, 1952, Issue

Let's Go Fishing in a Farm Pond

Artificial Bait Catches More Bass

Frederick S. Barkalow, Jr.

Condensed From Research and Farming

ALTHOUGH the recreational value of farm ponds has long been recognized, farmers have been slow to use their ponds as a source of meat.

Surprising as it may seem to the fisherman-at-large, one main reason for this is the difficulty of catching or harvesting this new farm product. Another reason is that stocking and fertilizing practices now in use do not always give good results.

Certainly, the importance of the pond as a recreational area for swimming, boating and fishing should not be minimized. But the use of the pond for crop and pasture irrigation, stock watering, fire protection, erosion control and fish production offers even more in the form of economic benefits.

Studies Begun in 1948

Investigations to determine the best management practices for maximum fish production were begun during the fall of 1948 as one part of a multiple-use study of farm ponds.

Pond No. 1 is typical of Upper Coastal Plain black water ponds with pH of between 5 and 6. On August 18, 1948, 2,500 bream were released in the pond, although clearing had not yet been completed. No attempt was made to poison the small stream entering the pond.

The water level was held to a minimum until early September, when all clearing was completed. The pond filled by February 25, and the last 1,500 bream were stocked on March 9, 1949. Four hundred fingerling largemouth bass were placed in the pond on May 11, 1949.

Make Rapid Growth

Although stocked at the rate of 1,300 per acre, the bream averaged 1.8 ounces and 5½ inches in length by September, 1949. The bass, stocked at the rate of 120 per acre had grown from fingerlings 1 to 2 inches long in May to an average of 8⅝ inches long and 5.9 ounces in weight by September, 1949.

Reprinted from Research and Farming
Raleigh, North Carolina, Spring 1952

Bream harvested by fishing in early May, 1950, averaged 3.1 ounces and were 6 inches long. The bass also continued to show good growth, averaging 8.8 ounces in May, 1950. A number were taken that weighed between 10 and 12 ounces.

Recreational But Inefficient

The pond was opened for general fishing on May 15, 1950. During the 181-day period (May 15 through November 10, 1950), the pond was fished on 84 separate days.

One year's results are not enough from which to draw definite conclusions. However, it is obvious that hook and line fishing, while high in recreational value, is not an efficient method for harvesting these species.

Natural Vs. Artificial Bait

In the case of bream, there was little difference between natural and artificial bait in the number of fish taken per hour.

Artificial lures were used only 22 per cent of the total fishing time. Yet they accounted for 46 per cent of all the bass taken. Bass caught with artificial baits averaged 3.2 ounces per fish heavier than those taken on natural baits. Hence, it is obvious that artificial lures were considerably better than natural bait for catching bass under the conditions of this experiment. Seventy-seven of the original 400 bass were recovered by fishing the first year. The largest weighed 22.2 ounces and was approximately 18 months old.

A total of 162 pounds of bream and 56 pounds of bass were known to have been removed by hook and line fishing during the first year—an average yield of approximately 65 pounds of fish per acre. The illegal take could not be evaluated, although a number of adult bream were known to have been removed from a trap on one occasion.

The pond was fertilized three times with 6-8-6 at the rate of 90 pounds per acre per application.

Don't Put Your Socks in the Freezer—An incidental bit of information from Virginia states that it does no good to put nylon stockings in the freezer. They will run just the same. We publish this fact to properly arm you against what might happen if the reverse information gets to your lady folks.

Report on Foot and Mouth Disease

Outbreak of foot and mouth disease in Canada has caused widespread concern in this country. In order to give Farmer's Digest readers the latest news from a border state, we asked Mr. Ralph West, secretary and executive officer of Minnesota's Livestock Sanitary Board, to give us a report. His letter is reproduced below:

"On February 25 the Livestock Sanitary Board was advised by the Bureau of Animal Industry, U.S.D.A., that foot and mouth disease had appeared in Canada in the Province of Saskatchewan in the vicinity of Regina. We were further advised that the Canadian Government had quarantined the infected area. Also that the Canadian-United States border had been immediately closed for the movement of any animals susceptible to foot and mouth disease or any material which might convey the contagion.

"On February 28 this information was furnished all practicing veterinarians in Minnesota by a letter from this office. Each veterinarian was requested to immediately report any case in any way suspicious of foot and mouth disease encountered in his practice.

"Steps were immediately taken to inspect all livestock known to have been imported from Canada from July 1, 1951. These inspections have been completed with no evidence that any animals were affected with foot and mouth disease.

"Veterinarians have co-operated splendidly in reporting suspicious cases. Numerous inspections are being made, but to date no evidence of foot and mouth disease has been detected in Minnesota.

"The United States Bureau of Animal Industry has reinforced the border patrol along the Canadian border by assigning an additional veterinarian to each port of entry and five inspectors to assist in enforcing the embargo against Canadian livestock and other products should an effort be made to move them into the United States at points other than ports of entry. They have also appointed inspectors at the Lake Superior ports to prevent the landing of any livestock or material possibly infected with foot and mouth disease virus originating in Canada.

"The Livestock Sanitary Board is fully aware that the danger of importation of this disease will continue to exist until it has been completely eradicated in Canada and every effort will be continued to prevent its importation into this state or to immediately stamp it out in case the disease should appear."

There's Money in Sheep

Condensed From Pennsylvania Farmer

Harold Donovan

FOR THE past 15 years the sheep industry in the United States has dwindled to skeletal proportions. What happened in the northeast particularly, where the farms are so well suited for sheep production?

When sheep ran on permanent pastures many farmers began to have trouble with internal parasites. Then as the larger cities blossomed out, farmers deserted their sheep flocks for more intensive farming. They found that dairy production suited their needs better. This is even true of the Pennsylvania farmer who has the best lamb markets in the country at his fingertips: Pittsburgh, Boston, Philadelphia, New York. But with these large cities nearby the farmer decided to concentrate his time and energy on providing fluid milk to these markets.

Sheep for Semi-Retired Farmer

For the semi-retired farmer the sheep flock is the ideal solution. Sheep take little time out of the entire year. If you like them, here's a steady income without breaking your back night and morning to get money out of them. Even the busy farmer might look into this as a naturall side line to dairy. Sheep don't need expensive food and they give a double return for the labor: Their wool is at an all-time high and lamb is a popular meat on the American table. Lamb prices established a new record top: $42.50 in the Chicago market last year.

We have a neighbor who liquidated his dairy holdings recently and everyone thought he would be like so many other retired farmers spending his last days happily (?) in the city. Instead, he increased his sheep flock rather steadily and stayed on the farm, a gentleman of leisure with plenty of time off for hunting and fishing such as he never had in the past. Right now he has 75 ewes and they give him a safe annual income.

Like Sheep?

Anyone can raise sheep. The main thing about this business is that you have to like working with

Reprinted by permission from the Pennsylvania Farmer,
Pittsburgh, Pennsylvania, April 14, 1951

sheep. Some farmers don't like chickens. They would never make out well in the poultry business. The same is true of sheep. In nine cases out of ten the farmer who has a liking for sheep will succeed. It is almost unnecessary to add that it also takes intelligent management, proper feeding and prompt treatment of internal parasites for the farmer to succeed in the sheep industry.

The trouble with so many young farmers today is that they can't be coaxed into the sheep business. Their fathers never had a sheep flock, so why should they? It is hard for the agricultural teacher to persuade pupils to start a sheep project. Those who go home momentarily enthusiastic return the following day with their thoughts against it. Their fathers talked them out of it. This is unfortunate. The demand is there, plenty of markets, the supply is limited and will be for years to come and yet few people are willing to try their luck at it. The present number of sheep in this country is far short of meeting wool and lamb needs.

There are certain problems in sheep management. Especially is this true in the winter. Any grade of the English mutton breeds would be desirable. They are hardy and thrive well on any soil except damp, swampy land. Sheep barns do not have to have that new look. Any dry barn free from drafts would suit the purpose.

Just imagine that you've bought a flock of 25 breeding ewes. After you have found proper shelter for them, the first thing to keep in mind is feed. Any good legume hay will suffice: Red clover, soybean, alfalfa. Try to stay away from timothy. The seeds get in the wool. Thousands of pounds of off grade wools are sent to market each year. The mills place a penalty of several cents a pound on these wools. With proper care and management a shepherd won't have off grade woll to market. It will be first rate.

Winter grazing is a necessity for pregnant ewes. The shepherd who does not want a small lamb crop will see to it that the sheep have plenty of feed and exercise before lambing. It is natural for sheep to paw off the snow and graze under it. This will give the flock the exercise they need. A few weeks before lambing time the sheep should have a supplement feed; especially is this true if they do not have good quality hay.

Once the lambs are dropped a good working arrangement is to separate the ewes with single lambs from those with twins. Naturally the latter will require heavier feed. Keep away from frozen or moldy silage at this time in particular. Sheep need a sufficient supply of salt and water

daily. Count on the average ewe consuming four quarts of water daily.

Creep Feeding for Lambs

Creep feeding is a popular practice nowadays. The lambs are fed separately from the ewes and given grain feed and legume hay. Place the creep in one corner of the shed. About two to three weeks after birth the lambs should be castrated if they are not going to be used for breeding purposes. Some shepherds prefer to dock and castrate at the same time. This eliminates handling the lambs twice. Others like to do these operations at different times, thus lessening the shock to the lamb.

The time of breeding depends on what kind of sheep business one is working for. Normally the beginner will depend on early fall lambs and wool for his return. Therefore he will breed his ewes to lamb in March or April. If he has experience and ample warm quarters he may try his luck at producing off season lambs. In other words, he is going to beat the flush season of fall lambs and market summer lambs or even Easter lambs. These bring premium prices.

To return to the beginner who will settle for less profits and considerably less risk. He will turn the buck with the sheep about October 15. Then he will make sure the ewes are settled. This i seasy if he will use some kind of marking on the ram and change the color every 15 days.

Parasites, Plowing, Phenothiazine

The best way to avoid internal parasites in sheep is to buy sheep in areas where there is little or no infestation of worms. When there is the first faint indication of trouble plow the pasture to some crop and keep the sheep off it for a year or two. More money is the reward for constant vigilance. A plentiful supply of phenothiazine salt tablets at all times and a dosage of liver fluke pills once during the summer for each ewe is a good practice.

In some areas out west sheep have been covered with a cotton cloth to protect their wool from burrs and chaff. This keeps their wool cleaner and gives the farmer greater returns in the long run. It is questionable whether the cost of the cotton slip, which must be provided every two years, could be taken care of in increased prices. To date the farmer has found this difficult to obtain.

The old rules still apply.

1. Never shear when fleeces are damp.
2. The shearing floor always should be clean.
3. Roll the fleece flesh side out and tie with paper twine.
4. Never use a sisal twine.
5. Remove all dung locks before tying the fleece.

6. Avoid using too much twine. Two strings each way are sufficient.

7. Do not tie fleeces too tight.

8. Store wool in a cool, dry place where it can be kept clean.

9. Wools stored where they take on moisture may become musty.

If you don't expect quick returns on your money and yet would like more than the bank's two per cent, try your luck with sheep. By the second year, profit should come rolling in—no tidal wave—but it will be steady and you'll have a lot of fun in the long run.

What to Do When the Home Freezer Stops — If the electricity goes off and the home freezer stops running, check first to see how long the current will be off. If this will be a considerable time, take the following steps:

Keep the freezer closed . . . open only if you need to take the food to a locker plant, or add dry ice.

Estimate how long the food will keep . . . with the freezer closed, food will usually stay frozen in a fully loaded cabinet two days . . . in a cabinet with less than half a load, not more than a day. How long the food will stay frozen depends on the amount of food in the freezer, the kind of food, the temperature of the food, the freezer itself, and the size of the freezer.

Us the freezer locker plant . . . make arrangements with the nearest freezer-locker plant to take care of food in an emergency. Wrap the food in plenty of newspapers and blankets, or use insulated boxes . . . rush it to the locker plant.

Use dry ice if you can get it . . . if it looks like the current will be off for more than a day, 50 pounds of dry ice will keep the temperature down to 15 degrees Fahrenheit for about two days in an average size freezer. Move food from the freezing compartment to the storage compartment. Now you may cover the freezer with blankets . . . fasten or pin so the air-vent is left open, in case the current comes on unexpectedly and ventilation is needed.

What to do with thawed food . . . you can refreeze thawed fruit if it still tastes and smells good. Or use in cooking or making jams, jellies and preserves. Examine thawed meat, poultry, vegetables, fish and cooked foods. Do not freeze if they have thawed completely. If you do refreeze, do so quickly. *Utah Extension Service*

A Lease That Will Last

Condensed From Research and Farming

C. B. Ratchford and G. W. Forster

TENANCY is an important institution in this country. In North Carolina almost half of the farm operators rent all or part of the land that they farm, and in some counties over 70 per cent of the farms are tenant-operated. If mechanization, livestock production, and the whole array of new farming methods are to become general, they must be adopted on tenant-operated as well as owner-operated units.

The North Carolina Experiment Station began a study in 1949 to see if rental arrangements permit the adoption of new methods. A survey was made of 479 rental arrangements located in all parts of the Coastal Plain. Several concrete recommendations for improving rental agreements have come out of this study.

Suggested Types of Arrangements

Types of rental arrangements in use in the Coastal Plain in order of their numerical importance are: Cropper, share, cash and share-cash. Eighty-seven per cent of the agreements are classified as cropper agreements. (In this study croppers were classified as share tenants who perform none of the management. They are really farm laborers receiving a share of the crop in lieu of cash wages.)

All types except cropper agreements permit an efficient agriculture, if the provisions suggested in the following sections are incorporated. Cropper agreements are not satisfactory because the landlord and cropper do not share management duties and because the landlord usually furnishes power and equipment.

Improvements Needed

1. *Security of tenure must be provided.* Both landlords and tenants need greater security of tenure—that is, the tenant needs to be sure of employment, while the landlord must be assured of having someone to operate his farm. Longer term leases are a partial answer. Automatic renewal and termination notices of three to six months will add security as will provisions for compensation.

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2. *Arrangements must permit flexibility in operations.* Practically all leases now in use last for one year or less and thus do not long stand in the way of needed changes in the farm operation. When long-term leases are used to add security of tenture, they must provide for this same flexibility of operation. Such flexibility may be had either (1) by preparing an annual farm plan which becomes a part of the lease; or (2) by providing for termination of the agreement if the farm plan and other provisions of the lease are not carried out.

3. *Compensation provisions are needed.* Compensation provisions protecting both the landlord and tenant are necessary when the lease provides for such major changes as seeding pastures and fencing. An arbitration board which should be provided for in the lease can determine the amount of compensation due either party.

4. *Leases should be written definite and comprehensive.* If a lease lasts for over three years, it should be written, notarized and recorded. An agreement can be definite only if it is written. Following is a list of major provisions that a good written lease should contain:

a. General plan of operation.
b. An annual farm plan showing cropping and livestock systems and production and conservation practices.
c. A farm development plan.
d. Designation of management responsibilities.
e. Method of sharing all costs and returns.
f. Contributions of the landlord to the family living of the tenant.
g. Responsibility of the tenant to maintain permanent improvements.
h. Arrangements for terminating the agreement.
i. Means of arbitrating disputes.

5. *The rent should be fair.* The survey showed that cash rentals were low, while the rent paid by croppers was generally fair, and that paid by one-half and one-third tenants was high. The cash rental should give the landlord a net income equal to that which could be earned from alternative investments. In a share rental agreement, income should be divided in the same proportion as contributions to production.

Special Provisions for Cash Leases

1. *A flexible rent is needed.* The cash rent should be permitted to fluctuate with the price level and possibly with varying weather conditions.

2. *There should be a separate rent for land and improvements on the land.* The landlord will likely not supply improvements such as pastures, buildings and good housing for the family unless

a rent is computed for these items.

Provisions for Share Agreements

1. *The tenant should own power and equipment.* Tractors and machinery are a substitute for labor. Since labor is normally the tenant's main contribution to the agreement, he should also furnish the power and equipment. Otherwise the desirable trend toward mechanization will not take place.

2. *Provide incentives of maximum input.* When one party furnishes all of a factor such as labor but receives only a share of the returns, the tendency is to contribute less than the desired amount of that factor. This may be corrected through penalty or bonus provisions or by sharing the cost beyond a certain limit, as for example, the landlord paying for part of the harvesting. The number of factors for which the cost is not shared should be kept to a minimum.

3. *Shared costs should be in the same proportion as shared income.*

4. *The share agreement should include all enterprises.* If the share agreement does not include all enterprises, the landlord will not provide enough facilities for those enterprises in which he does not share. Similarly, the tenant will spend a disproportionate amount of time on these enterprises.

5. *Productive livestock should be owned in the same proportion as income is shared.* Where livestock is not owned in the same proportion as income is shared there is an obstacle to expanding the enterprise. Other difficulties also arise such as determining the ownership of the offspring.

6. *Management responsibilities should be shared.* The maximum amount of management will not be forthcoming unless the responsibility is also shared. Such decisions as determining the farming system should be made jointly. Others, such as when to buy and sell should be made by the better informed party. Day-to-day management usually should be left to the tenant.

Patrick Henry Said a Hundred Years Ago — "We might as well know that when we argue and quibble over legalistic phraseology and throw trick words and empty symbols at each other, our land is washing away, trickling slowly, then running faster, then faster and faster, then gushing and roaring and storming and flooding, water is carrying our land down to the sea."

Power Farming With LP-Gas

Condensed From the Missouri Ruralist

NEWEST development in mechanized farming is equipment operated by LP-gas. Thus the same magic fuel that modernizes your living also can bring your field and chore work up to date. It is the most versatile source of power on the market. That is because it will do so many jobs in so many places. And best of all, experienced farmers say it lowers their operating costs.

When W. F. Fairchild of Pawnee, Kansas, changed to LP-gas he cut daily tractor fuel costs by nearly a third. That amounts to big money in the course of a season's operations. But that's not all. He gets increased power from the conversion.

"We run the same number of hours on 46 gallons of propane that we formerly ran on 40 gallons of gasoline," he said. "The propane at 9c totals $4.14, while gasoline at 16c totals $6.40."

That makes a difference of $2.26 a day. But that's just the start in savings. LP-gas burns clean. There is no carbon, no gum, no crankcase dilution and no sludge. Overhauls are reduced by half at least and oil consumption by about two-thirds because it doesn't need changing so often.

Fairchild has two tractors, one 4-wheel and one tricycle, general purpose type. One was converted two years ago and the other three. Both are equipped with 23 gallon LP tanks, which are filled from 1,000 gallon storage once a day. The general purpose tractor is equipped with high altitude pistons, which raises the compression and increases the machine's power by about 15 per cent.

Danger of running out of propane in the field is no greater than with any other fuel, Fairchild said. The tanks are equipped with float gauges. "But if we do run out, we just switch over to gasoline and come on in," he explained.

From the same storage, the Fairchilds heat their house by floor furnace and radiant appliances, cook their meals, operate a refrigerator, and heat water for home and dairy.

LP-gas is being used in the following ways:

LP for Tractors

Most tractors running on the gas are conversions. A few are

Reprinted by permission from the Missouri Ruralist
Topeka, Kansas, March 22, 1952 Issue

factory equipped. Nobody knows just how many change-overs from other fuels have been made. Phillips Petroleum Co. estimated the number at 170,000 by the end of 1950, with 100,000 of those made during that year. If conversions proceeded at that rate for 1951, there must be close to 300,000 now. Two tractor manufacturers already have factory equipped LP-gas tractors on the market and other major manufacturers are reported to be working on test models.

LP-gas also is powering truck, bus and even airplane engines. Vehicles operated on the fuel also give longer service between overhauls and consume less oil than those which burn gasoline. That is because LP-gas doesn't foul the engines and does not dilute crankcases.

LP for Flame Throwers

A new method of weed control has developed in recent years. It is the flame cultivator. It already has been proved practical for several vegetable crops, for cotton, strawberries, sugar cane, sugar beets and for killing preplanting weeds. In some places it has been used to weed alfalfa, corn and soybeans. Shields, of course, are necessary on the more heat-tender crops.

For several years Purdue University has been experimenting with methods of preserving the carotene in alfalfa hay. One promising method is flaming the standing crop to inactivate the enzymes which destroy carotene. A machine was constructed which flash-heats the plants with LP-gas flame as it passes over them.

Another recent development is a gas burning grain dryer mounted on a combine. It was tried last season on wheat, grain sorghums and other small grains. Purpose of the equipment is to extend the harvest day and possibly permit around-the-clock harvesting.

LP for Engines

LP-gas also is adapted to operating various auxiliary engines on farm equipment such as combines, forage harvesters, potato digger-graders, field balers and sugar beet loaders.

It also is used for stationary engines that do feed grinding, grain rolling, forage chopping and blowing, silage cutting and blowing, crop dryer fans, elevating grain and hay, wood sawing, pumping water, operating farm lighting plants, electric generators and milking machines.

LP-gas makes stationary engine operation even cheaper. One of its important applications is pumping, especially large quantities of water as for irrigation. Many an LP engine operates day and night during the critical growing season for long periods without attention, and without failure.

LP in the Milkhouse

Every producer of high-quality milk must have heat and refrigeration. Regulations require hot water or steam for cleaning and sterilizing equipment and utensils. Refrigeration is necessary to cool the milk quickly and keep it at safe temperatures until delivered. These requirements can be provided by the dairyman with a single installation.

LP for Poultrymen

More and more poultry keepers are turning to LP-gas for brooding. Here's why they like it: The fuel is clean—burns without soot, dust, grease film or ashes. Heat control is positive, even in delicate adjustments required for young birds as they advance in age. It is as safe as any fuel can be both with respect to fire and to failure hazards.

Further users contend cold-room brooding is at its best with this versatile fuel. In this system chicks get heat only under the hover. They must run out into the cool room for feed, water and exercise. That means they feather early and well, grow strong and hardy.

The same dependable features which attract poultrymen make LP-gas a desirable pig brooder fuel. It can be used to heat the farrowing house directly or to heat water circulating through pipes laid in floor or along walls.

LP for Frost Protection

Fruit and vegetable growers live in constant dread of frost during early spring and sometimes in fall. Recently burners have been developed for LP-gas in frost protection. Owing to the nature of the fuel, its heat can be directed toward the ground (on to a pile of stones) from which it is radiated upward around trees and plants.

LP for Tank Heating

Dairy cows and laying hens will not drink enough icy water to maintain highest production. Neither will cattle, hogs or sheep. And what they do drink must be warmed by their bodies before it can go to work. High priced feed is an expensive fuel. Then there's that job of chopping out the tank.

Equipment manufacturers are now putting out scientifically designed heaters which operate on LP-gas. These heaters are highly efficient, trouble-free and leave no soot, oil films or odors in the tank.

LP for Crop Drying

Crop drying is rapidly becoming a standard farm operation. Just about everything stored can be dried to advantage if harvest time moisture exceeds safe keeping levels. That includes corn, all small grains, planting seeds, soybeans, grain sorghums, peanuts, sweet potatoes, cotton, broomcorn and various forages.

Drying will insure higher quality hay and is practical for producers who must have the most nutritious roughage. Drying also is resorted to in ripening and dehydrating certain fruits and in curing tobacco. An ideal fuel for all these operations is LP-gas.

New Cattle Disease Reported in Colorado — What is believed to be a new disease affecting the hind feet of cattle, reported for the first time in America, has been discovered in two counties in western Colorado, according to the animal husbandmen at Colorado A & M Experiment Station.

The disease, termed fescue foot or fescue lameness, is caused by a toxic substance, resembling ergot, contained in a certain species of tall fescue grass, known as Reed's fescue. The substance causes a restriction of the blood supply to the hind feet, resulting in lameness and a sloughing of the hoof of one or both hind feet.

Reed's fescue grass in western Colorado is most commonly found on wet, poorly drained land or along ditch banks. It is a tall, coarse, rather unpalatable species of fescue, which cattle as a rule do not consume when other more palatable feed is available. It is not believed that other species of fescue grasses, such as recommended for range or pasture grass mixtures, carry any of this toxic substance.

Vaccinate Pig Crop Against Cholera — Cholera continues to be the No. 1 killer of swine and losses from this disease are probably equal to the total of all infectious swine diseases. Control is a matter of prevention rather than treatment, according to Purdue university veterinarians. That most cholera outbreaks occur in unvaccinated herds is an important reason for vaccination. While the disease has occurred in vaccinated herds this is no excuse for letting up of vaccination, as has been the tendency during the past years.

Brucellosis Program Continues Progress — Percentage of infected cattle discovered by official brucellosis tests continued to decline in the United States during the first six months of the present fiscal year. From July 1 to the end of December, 1951, reactors dropped from 3.1 per cent to 2.6 per cent of the cattle tested. In this period 2,923,988 cattle were tested and 76,958 reactors found.

Watch for Rhinitis — Be on the alert for infectious rhinitis—a disease that strikes mainly at baby pigs. Call your veterinarian if your pigs rub their snouts on the ground, sneeze frequently or have a bloody discharge from the nose.

Now Hogs Need Less Protein

Balance Rations With Respect to Vitamin B12, Other B-Vitamins and Trace Minerals; Add an Antibiotic and Save Expensive Protein

Damon Catron, Aldon Jensen, Helen Maddock, Gordon Ashton and Paul Homeyer

Condensed From Iowa Farm Science

MANY Iowa hog producers have been getting good gains on their hogs the past two years with less protein in the rations than the amount that's been recommended.

What's the story here? What's wrong with the previously recommended protein levels? If you can get good results with less protein, why were higher levels ever recommended?

We believe that the protein levels recommended in the past probably were supplying, in addition to the protein (amino acids), other things the hogs needed, too, such as water-soluble vitamins (vitamin B12 and other B-complex vitamins) and trace minerals. Now new and important changes have come in hog feeding!

During the past two years, feed manufacturers and feeders have been able to get new feed ingredients — antibiotics, vitamin B12 and other B-vitamins. Adding these ingredients now is more practical and economical than to add the extra protein over what's required in order to get the vitamins and minerals protein feeds carry. These new feed ingredients have produced faster, more economical gains, and are the basis for recommending lower protein levels for swine.

Here's the story in a nutshell:

If you balance your hog rations with respect to vitamin B12, other B-Vitamins and trace minerals, and add an antibiotic, you don't need the higher protein levels recommended in the past!

These new ingredients in hog feeds are making the difference. Hog producers are now asking two big questions:

1. Do the new growth-producing ingredients actually replace protein in hog rations?

No! These growth-producing nutrients cannot replace all extra protein in your hog rations. We already knew that corn alone didn't make a balanced ration. Even adding the new growth-producing nutrients to corn still doesn't make a balanced ration. These nutrients work *with* pro-

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tein ingredients and corn to make the total ration better.

2. What level of protein *now* is recommended when feeding hog rations that include the new ingredients?

The most satisfactory level of protein to balance a hog ration that includes antibiotics seems to be around 14 per cent from weaning to 75 or 100 pounds—after that 12 per cent and about 10 per cent from 150 pounds to market weight.

What We Did . . .

In the light of the recent advances in animal nutrition, the study reported here was conducted to re-evaluate the protein requirements of growing-fattening pigs fed in concrete drylot with and without the antibiotic, aureomycin.

In our experimental setup, we fed four different sets of protein levels to four lots of pigs on each level. Starting protein levels were 20, 18, 16 and 14 per cent. When the pigs reached an average weight of 75 pounds, we reduced the protein content of the rations to 17, 15, 13 and 11 per cent, respectively. And at 150 pounds, the levels were again reduced to 14, 12, 10 and 8 per cent protein.

To determine the effect of an antibiotic on protein requirements, one-half the pigs were fed 10 milligrams of aureomycin per pound of ration.

A total of 128 weanling Duroc pigs averaging approximately 34 pounds were started in the test. The pigs were confined to concrete pens during the entire feeding period. They were self-fed and automatically watered.

Rations for the pigs included ground yellow corn, solvent soybean oilmeal, steamed bonemeal, iodized calcium carbonate, a trace mineral mixture, iodized salt and a complete vitamin premix. We obtained the different protein levels by adjusting the corn and soybean oilmeal content of the ration.

Six barrows were slaughtered from each of the four protein-level treatments, including those both with and without aureomycin. We measured back fat, body length, body depth and total per cent of lean in selected cuts to find out if there were differences due to the different levels of protein or the presence or absence of aureomycin.

What We Found . . .

Results from our tests fall into the four weight periods of the pigs: (1) weaning to 75 pounds; (2) 75 to 150 pounds; (3) 150 to 200 pounds; and (4) the total period from weaning to 200 pounds.

Initial to 75 pounds weight: Different protein levels had no pronounced effect upon daily gains and feed intake either with or without aureomycin during

this period.

The feed per 100 pounds of gain showed considerable apparent variability—especially in the absence of the antibiotic. The values for the different protein levels in the absence of the antibiotic were significantly different. The reason is not readily explainable. On the average, antibiotic feeding saved 21 pounds of feed in making 100 pounds of pork during this period.

We found no evidence to indicate that a protein level higher than 14 per cent is superior in any respect for the growth of weanling pigs fed a balanced corn-soybean oilmeal ration under the conditions of our experiment.

75 to 150 pounds weight: A protein level higher than 11 per cent for pigs heavier than 75 pounds didn't stimulate faster growth either in the presence or absence of aureomycin. There were no significant differences in daily feed intake.

We did find significant differences in feed required per 100 pounds gain. Where no aureomycin was fed, there was a steady increase in feed efficiency as the per cent of protein was lowered. Again, this did not happen in the antibiotic-fed pigs where feed efficiency was relatively constant regardless of the protein level fed.

Prolonged excessive looseness of the feces in the pigs fed higher levels of protein without the antibiotic probably caused the accompanying decrease in feed efficiency. No pigs fed the antibiotic showed this looseness. This, undoubtedly would account partially for the greater feed efficiency in the antibiotic-fed groups.

150 to 200 pounds weight: During this period the pigs responded differently when fed the different protein levels—depending upon whether or not they got aureomycin. When aureomycin was in the ration, the amount of protein didn't make significant differences in daily gains. But without aureomycin, the amount of protein affected the gains. The 8 per cent protein fed pigs failed to gain as fast as those fed more protein.

The greater daily gain made by the pigs fed 8 per cent protein rations with antibiotic over those fed the same protein level without antibiotic suggests that the aureomycin had a "sparing-like" effect on the protein.

The amount of feed the pigs ate varied more during this period than in any other. The antibiotic in the ration did not, on the average, increase daily feed intake. But with aureomycin included in the ration, the feed intakes varied significantly over the range of protein levels. The 8 per cent protein antibiotic fed pigs consumed more than a pound less feed per day than the pigs

fed other protein levels. None of the differences in feed required per 100 pounds gain were significant in this period.

Total period (initial to 200 pounds weight): The gains over the entire feeding period showed significant differences for the different protein levels only when the antibiotic wasn't in the ration. When the antibiotic was fed, we found no significant differences in daily gains among the different protein levels.

Based on the actual amounts of each ration consumed by the 32 pigs on each set of protein levels from weaning to 200 pounds, the total averages of protein consumed for the entire test were 16.6 per cent for the 20-17-14 per cent lots; 14.7 per cent for the 18-15-12 per cent lots; 12.7 per cent for the 16-13-10 per cent lots; and 10.8 per cent for the 14-11-8 per cent lots.

Dressing percentage, body length, body depth and per cent of lean were not significantly influenced by the protein content of the rations nor by the absence or presence of the antibiotic.

What It Means . . .

Under the conditions of our study, 14 per cent protein was adequate to balance the ration for weanling pigs. Contrary to previous recommendations, higher levels of protein are more than pigs need when the rest of the ration is balanced.

Without an antibiotic, the 16-13-10 per cent (12.5 per cent average) combination supplied the pig's protein needs from weaning to market. However, the 14 and 11 per cent protein rations were adequate up to 150 pounds. *But* 8 per cent protein (corn, vitamins and minerals but with no protein supplement) without antibiotic was definitely too low from 150 to 200 pounds.

However, in the presence of an antibiotic, the 14-11-8 per cent (11 per cent average) combination produced gains equal to higher levels of protein. Therefore aureomycin, added at the rate of 10 milligrams per pound of ration, appears to have a "sparing-like" effect on protein at the lower protein levels.

On the average, pigs receiving the antibiotic in their ration gained 0.12 pound more per day and consumed 23 pounds less feed per 100 pounds of gain than the pigs not receiving the antibiotic.

Although the 14-11-8 per cent protein combination of rations with the antibiotic gave results comparable to higher protein levels in this experiment, we are making a more conservative recommendation for average farm conditions. For weanling pigs up to 75 pounds, a balanced ration, including vitamin B12, other B-vitamins, trace minerals and antibiotic, might more safely contain 14 per cent protein; for pigs from

75 to 150 pounds, 12 per cent protein; from 150 pounds to market weight, 10 per cent protein.

If you have been feeding the higher levels of protein, the results of this research indicates that you can save from 79 to 117 pounds of 40 per cent supplement equivalent for every 240 pound hog marketed.

What Are Farms Worth Today?

If you're thinking of buying a farm, you'll likely need more money per acre to swing the deal in Illinois than in any other large agricultural state—and you'll probably pay more than twice as much as you would have paid in 1940.

Farm property values as reported in the 1950 Census of Agriculture showed Illinois fifth from the top with an average of $174 an acre. New Jersey was highest at $293, followed by Connecticut, Rhode Island and Massachusetts with averages of $248, $232 and $190 an acre, respectively. These four comparatively small states, however, have a combined acreage of less than half the state of Illinois and are near dense urban developments.

All grades of land were combined in the census averages.

C. L. Stewart, agricultural economist in the Illinois College of Agriculture, says we should not confuse these census figures with present land values—since per acre values have continued to rise since 1950.

In Illinois, values have increased 25 to 30 per cent in the last two years, the present average being more than $220 an acre. This is only an average, Stewart emphasizes, with sale prices on select farm lands often exceeding $500 an acre.

In general, values went up the least in the northeastern states between 1940 and 1950, and most in the mountain and Pacific coast states. Per acre values rose only 76 per cent in the New England region compared with 149 per cent in the mountain states. The increase was 103 per cent in the east north-central area.

According to the census, Texas was the top ranking state in total farm real estate value, with 6.7 billion dollars. California moved up from fourth to second place from 1940 to 1950; while Iowa, which ranked first in 1940, was in third place in 1950. Illinois was fourth, followed by Kansas, Ohio and Indiana. These total farm real estate values, Stewart points out, depend largely upon areas of the respective states.

Illinois Extension Service

Portable Electric Motors

What You Should Know About Their Selection and Care

Condensed From Rural Electrification News

AN ELECTRIC motor can do many of the chores the hired man has been doing, or it can relieve the farmer of drudgery while he gives his time to more profitable jobs.

Any machine on the farm, ordinarily turned by hand, can be operated with a small electric motor. It is important, however, that farmers get the most effective use of farm motors.

Most farmers have single phase service, which means that single phase motors are most common on farms. Motor sizes used on farms usually do not exceed five to 10 horsepower.

The two types of single phase motors which are most versatile for powering a wide range of farm equipment and machinery are the repulsion-start induction-run and the capacitor type. Split phase motors are generally lower in cost than the other two types, but are not suitable for use with equipment having heavy starting loads.

Motor manufacturers are now handicapped by the scarcity of critical materials. Capacitor motors use less critical materials than repulsion-start motors. This means that more capacitor than repulsion-start motors can be built with the materials available. Farmers who purchase capacitor-start motors may have to take certain precautions in extremely cold weather.

At zero or below, where difficulty is experienced in starting capacitor motors, they should be allowed to warm up for 5 to 10 minutes without load. The motor should then be stopped and connected to the load by putting on the belt. If the capacitor motor is started again immediately, generally it will be warm enough to start the load.

For the most efficient operation and for assurance of longer life for an electric motor, the manufacturer's instructions should be followed. In addition, certain safety precautions should be observed, such as the following:

1. Be sure the wiring is adequate.

2. Be sure the voltage is adequate; low voltage is likely to burn out a motor.

Reprinted from Rural Electrification News
February-March, 1952 Issue

GUIDE FOR REMEDYING TROUBLES IN SINGLE-PHASE MOTOR OPERATION

Trouble	Possible Cause	What to Do
Motor stalls.	Wrong application.	Change type or size. Consult supplier.
	Overloaded motor.	Reduce load.
	Low-Motor voltage.	Be sure wiring is adequate to supply nameplate voltage.
	Open circuit.	Fuses blown, check overload relay, starter and pushbutton.
Motor connected but does not start.	Motor may be overloaded.	Reduce load.
	Open circuit.	Check fuses, overload relay, starter and pushbutton.
Motor runs and then dies down.	Power failure.	Check for loose connections to line, to fuses, to control.
Motor does not come up to speed.	Not applied properly.	Consult supplier for proper type.
	Voltage too low at motor terminals because of line drop.	Consult electric co-op.
	Starting load too high.	Check load the motor is designed to carry at start.
Motor takes too long to accelerate.	Excess loading.	Reduce load.
	Poor circuit.	Check for loose connections, or consult electrician.
	Applied voltage too low.	Consult electric co-op.
Motor overheats while running under load.	Check for overload.	Reduce load.
	Air shields may be clogged with dirt preventing proper ventilation of motor.	Good ventilation is manifest when a continuous stream of air leaves the motor. If not, check manufacturer.
	High voltage	Have voltage check at terminals of motor with voltmeter.
Motor vibrates after corrections have been made.	Motor misaligned with machine it drives.	Realign.
	Weak foundation.	Strengthen base.
	Coupling out of balance.	Balance coupling.
	Driven equipment unbalanced.	Rebalance driven equipment.
Scraping noise.*	Fan rubbing air shield.	Remove interference.
	Fan striking insulation.	Clear fan.
	Loose on bedplate.	Tighten holding bolts.

*Scraping noise may be an indication of worn-out bearings. If this is the case, call a qualified electrician.

Caution: Do not attempt to make changes or repairs on electric motors until they have been disconnected from the circuit.

3. Follow manufacturer's instructions on lubricating bearings.

4. Keep motors clean and dry.

5. Keep tension properly adjusted on the belt of the motor.

Usually small motors are not entirely protected by branch circuit fuses. If a stalled motor is not protected by proper current limiting devices such as time-lag fuses, circuit breakers, or built-in overload protection, it will burn out.

Most motors, if used for the kind of load for which they were designed and if properly cared for, will give satisfactory service for years without trouble. However, occasionally they may give trouble and may even fail to operate. Some of the troubles will require the services of a qualified electrician, but many can be corrected by the farmer.

The following guide indicates the kind of troubles and suggestions for remedial measures which can be taken by farmers. For other troubles such as loose connections in circuit, defective rotor, grounded coil, shorted stator coil, defective bearings, and magnetic noise, a qualified electrician should be consulted.

Farm Economics

If the farmer gave away his cotton, a $3.75 shirt would still cost about $3.42.

* * * *

For every four people sitting down to a meal in 1950, there will be another person at the table in 1975, according to present population trends.

* * * *

Prices of 1952 crop wheat will be supported at a national average of not less than $2.17 per bushel. This is 90 per cent of the July 15, 1951, wheat parity price of $2.41.

* * * *

The American farmer has increased the size of his farm. Ten years ago, the average size farm in this country was only 174 acres, compared with 215 acres now. Both large and small farms are becoming more numerous, while middle-size farms are decreasing in number.

* * * *

The United States imports meat, mostly pork and lamb, from Canada, Denmark, Holland, Poland and Iceland, to the tune of more than 35,000,000 pounds. This is still only a fraction of one per cent of our production.

Skillful Feeding Cuts Broiler Costs

Modern Feeding Practices Produce More Meat Faster With One-Third Less Feed

John C. Brown

Condensed From American Poultry Journal

SIX YEARS ago, it required approximately four to four and a half pounds of feed to produce a pound of broiler meat, and the growing period ranged from 14 to 18 weeks. Today, we produce broiler meat on a commercial scale at the rate of about three pounds of feed to one pound of meat, and we do this in 10 or 11 weeks, marketing the birds when they weigh from three to four pounds.

At the 1951 National Chicken-of-Tomorrow Contest, held in Fayetteville, Arkansas, the average feed consumption for the 15,000 birds was 2.9 pounds of feed for each pound of chicken. The pen ranking first in feed efficiency had a 2.836 feed conversion and an average live weight of 3.612 pounds.

If you are a broiler grower, you are engaged in a business which has undergone amazing developments and revolutionary changes. Under present competition and minimum standards of efficiency, one man should be able to take care of at least 10,000 birds per lot, keep his mortality under 5 per cent, and have a feed conversion of three pounds of feed per pound of gain on a three pound bird. To show a satisfactory p r o f i t on today's prices, you should be able to meet these requirements or better.

You all know that to put meat on chickens you have to feed them well. Our feed manufacturers have done a good job of making feeds that are capable of putting weight and a good finish on broilers. But these feeds are of little value to a broiler grower if his birds have to push and fight their way up to the feeders. One of the first steps in skillful feeding calls for having enough feeder space.

This fact was emphasized at a recent meeting of southeastern poultrymen. One speaker told of

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Chicago, Illinois, April, 1952 Issue

a test in which a broiler house was divided into three sections. In one section, 20 four foot feeders were put in for every thousand birds. In another section, 30 feeders per thousand birds were put in, and in the other section, 40 four foot feeders per thousand birds were put in.

Here are the results of that experiment. In the section which had only 20 feeders per thousand birds, it took 2.9 pounds of feed to produce a pound of meat. In the section with 30 feeders, it took 2.69 pounds of feed per pound of meat. And in the section with the 40 feeders, it took only 2.49 pounds of feed per pound of meat. So the more feeders you have, the better will be your feed conversion and the more your profits. If you figure that a ton of feed is worth about $120, and that by doubling the feeder space from 20 to 40 feeders, you save about six tons of feed, it means a saving of about $720 on each 10,000 birds.

Another interesting comparison brought out concerned the number of times the birds were fed. In this experiment, the house was divided in half. In one half of the house, the birds were fed three times a day, and in the other half they were fed five times a day. They were all grown to three pounds. But the broilers fed three times a day had a feed conversion of 3.12, while those fed five times a day produced a pound of meat on only 2.87 pounds of feed. That may not seem like much of a difference, but on 10,000 birds, it would mean a saving of over three tons of feed, or about $450 extra profit. For that amount of money, it pays a grower to spend a little extra time in filling his feeders.

Instead of filling them full only three times a day, try filling them only one-half to three-quarters full five times a day. If you have hired help doing your feeding, apply a little psychology and explain how by only filling the feeders one-half to three-quarters full, there would be about 7,500 pounds of feed less to carry.

When feeders are filled full, the birds will only scratch it out onto the litter, and feed makes mighty expensive litter at present prices. It's good practice to have birds just about pecking at the bottom of the feeders before each new feeding. Also, to avoid feed waste, keep the height of the feeders at a level equal to the height of the birds' backs. Raise the feeders as the birds grow. This applies whether you use regular feeders or automatics.

To get good feed conversion also requires that you market your birds at the right weight and age, especially if they are straight run chicks. The 1951 Maine Broiler Tests clearly showed that pullet chicks are much less efficient in

feed conversion than are cockerels, especially if they are carried to heavier weights.

When feed prices are high and broiler prices not too good, it is inadvisable to keep pullets beyond the three pound weight. Under such circumstances, one should consider selling the pullets at about three pounds or less and holding the cockerels. If this is not possible, it would most likely pay to sell the entire flock at a point when the pullets are not over three pounds average weight. feed costs, though it has no bearing on actual pounds of feed required per pounds of meat, is the purchase of feed in bulk form whenever possible. Usually feed purchased in this form costs about $5 less than bagged feed per ton.

So to save on feed costs, buy good meat type strains of chicks and employ feeding practices that reduce the amount of feed required per pound of broiler meat. Remember, it's the fraction of a pound of feed savings per bird that runs into tonnage on a large number of birds and often means the difference between profit or loss.

Bonus Plans for Farm Help

Bonus plans for farm help are valuable in attracting and keeping good farm labor. They should be simple enough for anyone to understand, fair to both parties, should supplement wages rather than making the worker dependent on the bonus, and should be paid several times a year rather than in one lump sum annually. They should also be in reach of fairly good farm management.

W. T. McAllister, agricultural economist of the Delaware Agricultural Extension Service, gives the following bonus suggestions:

1. Three to six per cent of the milk check, paid from each check.

2. Fifty cents to a dollar on each 100 pounds of milk above an agreed amount.

3. Four to seven per cent of hog enterprise gross income.

4. Five to eight per cent of egg sales, or five to 10 cents per dozen eggs.

5. Two to four cents per bushel of grain, or a higher amount for each bushel above a given yield.

6. Broiler growers could base bonuses on feed conversion below a certain standard, or a low mortality rate, etc.

Too Much Sunshine!

Four Out of Five Farmers Let Hay Get Too Dry

Condensed From the Farm Journal

J. G. Cash and H. G. Russell

University of Illinois

MAYBE it's time for some plain, straight-from-the-shoulder talk about this business of making hay.

Last year we helped judge 900 samples of hay from Illinois farms. Out of those 900 samples, only about one-fifth were really top-notch hay. And we judges were pretty lenient, too.

What was wrong with four out of every five samples? Just this —*farmers let the hay get too dry before they took it off the field.*

We weren't looking at run-of the-mine hay, either. These farmers knew they were competing on a quality basis, so those 900 samples probably represent some of the best hay produced in Illinois.

Nearly every one of those 900 samples was cut at the right stage of maturity. Most of them were free of weeds. *Very few showed any signs of damage from rain.* It was what happened from the time the hay was cut until it got into the barn or stack that made the difference. This was true regardless of whether the crop was baled, chopped, or put up loose.

It boils down to this: No man or machine can turn out top grade hay after it's been burned to a crisp by a hot June or July sun. When you lose the leaves and that good green color, you lose feed value that counts up fast.

Let's look at some figures worked out by the University of Wisconsin. An acre of good alfalfa, cut at the right time and put up exactly right, will be about 57 per cent leaves and yield about three tons per acre. (That's 3,420 pounds of leaves.) There's as much feed in those three tons as there is in a ton of linseed meal plus one ton of corn and cob meal.

Now, let that same hay dry out and deteriorate until it has only 40 per cent leaves, and you will have only 1,720 pounds of leaves. Feedwise, that's the same as losing 700 pounds of linseed meal and 400 pounds of corn. Figured at today's prices, you toss about

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Philadelphia, Pennsylvania, June, 1951 Issue

$44 worth of feed out the window. If you have 20 acres, it adds up to $880.

If you leave that hay out in the hot sun for a few more hours, you end up with hay that is only 30 per cent leaves. You lose the equivalent of 1,100 pounds of linseed meal and 700 pounds of corn and cob meal. That's a $70 per acre loss.

We hate to see you pass up profits like these. Here are some tips that we picked up while talking with the farmers who entered our contests:

Hay loses quality a lot faster after it is cut than when it is growing in the field. So don't cut more hay than you can cure and put up quickly. *Start raking as soon as the hay is wilted, instead of waiting until you finish mowing the entire field.*

If you hire a baler or chopper, keep the mower in the shed until you know exactly when the custom operator is coming. Waiting is mighty expensive when there's a hot sun shining.

Put up the hay at the *just-right* moisture level. Baled hay can have 25 per cent moisture; loose hay, 20 per cent, and chopped hay, 15 per cent. But how do you tell in the field?

There are several rules of thumb. If the stems are slightly brittle, and no moisture oozes out when they're twisted, the crop is ready for the barn. Clover and alfalfa are ready when the outer skin cannot be peeled off with the thumb nail.

Spontaneous combustion is a risk. No doubt about it. As you know, a mow-curing set-up reduces the danger.

You may want to consider storing your hay outside. Lots of farmers are doing it — bringing their cattle to the hay instead of carrying stemmy hay to the cattle. That makes good sense to us.

But regardless of how you store your hay, remember that you stand to lose $40 to $100 worth of feed on each acre this summer, unless you get it up at the right time.

Save Labor With Plastic Pipe — It's easy to set up temporary, movable water lines to field tanks with the new plastic pipe now becoming available, says Frank Andrew, Illinois agricultural engineer. Plastic pipe is light, flexible, easy to handle and is not subject to rust or corrosion. It comes in sizes from a quarter inch to two inches in diameter in rolls 400 feet long. You can lift a 400-foot roll easily, because it is so light in weight. All you need for installation is a pocket knife to cut the material and a screwdriver to secure the fittings.

Better Way to Make Grass Silage With Sulfur Dioxide Gas

Condensed From Eastern States Cooperator

Dr. C. B. Knodt, Dairy Husbandry Specialist

Pennsylvania State College

SULFUR dioxide is a valuable and successful preservative for grass silage. Used in preservation of foods for human use for some time, its use in saving the feeding value of forage crops is relatively new.

In using sulfur dioxide, the crop can be cut when ready and put directly into the silo as soon as the dew or rain is off. Wilting is not required, hence the crop "flows" directly from mower to silo. To be successful any method of making grass silage must make a continuous operation of harvesting and storing because of the risks of rain and bad weather. Any crop which gets rained on rapidly loses its feeding value through leaching and fermentation of the cut plant.

Repeated trials at the Pennsylvania State College indicate that losses in dry matter amount to only about five to 10 per cent when sulfur dioxide is used, as compared to a loss of about 25 per cent if cereal grains, wilting or molasses are involved.

By using sulfur dioxide, the crop can be harvested at the time of its greatest feeding value instead of waiting until it is too mature. Early harvesting also makes possible greater second crop production at a time when hay can usually be made. For these reasons many dairymen now put their first crop into grass silage and their second crop into hay.

One complaint about grass silage heard frequently is that you cannot feed it out fast enough to the average size herd during summer months to prevent surface spoilage. With most methods of making grass silage it is necessary to empty the silo rapidly in summer or there will be much spoiled silage. Grass silage preserved with sulfur dioxide has repeatedly been found to have very little surface spoilage during the summer months. This permits slow summer feeding, and it's a very important advantage when pastures get short and the weather is hot.

How does the cost of making

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grass silage with sulfur dioxide compare with that of other methods? In making wilted or untreated grass silage, research data indicates a loss of 20 or more per cent of the dry matter. If silage is worth $12 a ton, or one-third the price of hay, this would be a cost of about $3 a ton. Since this method also has other disadvantages such as losses of crop due to rain while wilting and the frequent large losses due to spoilage, the cost of wilted or untreated grass silage runs into big figures per ton.

With Molasses selling for about $90 a ton on the farm and with a minimum of 80 pounds needed per ton of green material, molasses preservation would cost about $3.40 a ton or $340 for a 100 ton silo. In addition, molasses has many disadvantages such as the difficulties in handling and the problems in getting even distribution throughout the silage.

Because they've had sad experiences in making grass silage by the wilting method and without any preservative, many dairymen began using 200 pounds of cereal grains such as corn, oats or barley per ton of green material. At the present time, adding such a preservative will cost about $6 to $7 a ton of green material. Our experimental data indicates that with these methods of making grass silage about 25 per cent of the dry matter is lost in fermentation.

Preserving grass silage with sulfur dioxide will cost about $1 per ton of green material put into the silo. The losses in dry matter will usually be less than 10 per cent —unless not enough sulfur dioxide is used or the material goes in too dry.

Because of this saving in dry matter, sulfur dioxide saves more of the feeding value of the crop that's put into the silo and thereby reduces the amount of feed which must be purchased. On the basis of research data, too, sulfur dioxide greatly decreases the breakdown of protein into ammonia and thus saves more of this valuable nutrient for feeding.

Carotene, which gives milk its yellow color, is necessary for producing high quality milk. Sulfur dioxide preserves much more of the carotene than is saved by other methods of making grass silage. This carotene is not only necessary for producing yellow milk but also helps to improve milk's flavor. These qualities increase the markets' demand for milk. Milk produced by cows on poor quality hay or silage is low in carotene and this makes it more susceptible to the development of oxidized flavor. In late winter months this may become a serious problem and can result in the rejection of large quantities of milk. Anything which will

increase the carotene content of milk will help to prevent the development of this off-flavor

The labor required for making sulfur dioxide grass silage is no more than that needed for wilting, using molasses or cereal grains. Many dairymen who previously used these methods report that the sulfur dioxide method is easier and requires less labor than these other methods. The wilting method, for example, requires waiting for several hours or more after cutting and this is a serious disadvantage from a labor standpoint. The grain methods require grinding of the grain and care in adding it to the blower so as to get proper distribution of it in the silage. In using the sulfur dioxide method five feet of silage can—with new type applicators—be treated in a silo having a 12 foot diameter in about 10 minutes. This is a speedy way to prepare about five tons of silage.

Shortage of Trained Men Threatens Agriculture

A shortage of men qualified to train others in agriculture now threatens and may grow more acute during the next 10 years. The teaching of agriculture in high schools is immediately threatened, according to Ralph J. Woodin, department of agricultural education, Ohio State university. As time goes on, the Agricultural Extension Service, Soil Conservation Service, and the fields of farm management and industry also will feel the shortage. "Our students today are from the crop of depression babies, born from about 1930 to 40," Woodin said. Fewer children were born then—so fewer students are coming to college now.

Present demand by armed forces also is reducing numbers of trained men in agriculture. Many college men have earned commissions as reserve officers. They must serve before they can teach agriculture.

At high school age, many boys probably decide to stay out of college because they face military service. Factories also are competing for college-age farm boys.

Woodin said his department now has 13 more requests for teachers than can be filled. There are possible openings in another 20 schools that want to start vocational agriculture departments.

* * * *

From Horse Collars to Restraining Belts — The last horse collar manufacturer in Missouri has converted his factory to the manufacture of restraining belts for use in hospitals and insane asylums.

Handling Manure

Barn Cleaners Can Save Three Weeks Labor Per Year

L. A. Brooks

Project Leader, Electric Research Farm
University of Wisconsin

Condensed From Electricity on the Farm

REMOVING manure from the barn and spreading it onto the land has always taken a great deal of time, and a lot of hard work. The time required for cleaning the barn is the second highest time consuming job in the caring for dairy cattle. It is surpassed only by the time required for milking operations.

During the winter of 1950, time studies on various methods of cleaning the barn were taken on 10 Wisconsin dairy farms. It was found that an automatic barn cleaner saves between 110 to 140 hours of labor per year for a 24 cow herd.

At the Wisconsin Electric Research Farm the cross conveyor of the barn cleaner runs through a pen shed used for housing young stock. The concrete feeding areas in the pen shed are easily cleaned by scraping the manure directly into the cross conveyor. There are metal plates over the cross conveyor which can be lifted up when cleaning. The bedded area in the pen shed is cleaned twice a year with a manure loader.

With an automatic barn cleaner it has been necessary for the farmer to haul the manure out to the field each day. In many areas this is not practical because of deep snow during the winter and wet ground in the spring. In the fall of 1950 an extension was put onto the cross conveyor of the barn cleaner for piling manure. The entire extension is about 70 feet long and extends about 55 feet out of the barnyard. The bottom of the conveyor trough is cut at a diagonal so that the manure is gradually pushed off the side. The manure is all piled outside of the cow yard so that no cattle have access to it.

Although this method of piling manure has been used for only one year, there appears to be a great deal of merit for its continued use. It makes the chore

Reprinted by permission from Electricity on the Farm
24 W. 40th St., New York City, January, 1952 Issue

of barn cleaning automatic so that it is not necessary to haul the manure daily out to the field.

When field conditions are favorable, the manure is loaded into the spreader directly from the barn and hauled out onto the field. This is done by opening a trap door in the conveyor extension so that the manure drops into the spreader instead of being carried out by the conveyor.

Pasture Costs Only $1.60 Per CWT. of T.D.N. — Here is the best argument in the world for growing all the top quality roughage you can. In 1951, here is what it cost in New Jersey per 100 pounds of total digestible nutrients for the following feeds:

Pasture, $1.60; grass silage (alfalfa, first cutting), $2.30; corn silage, $2.65; hay, $3, and grain concentrates, $5.70.

Here is what you do: Grow all the pasture your herd will use from early spring until late fall. Raise all—or as much as you can—of your hay and silage needs. Plant the remaining acreage to adapted grain field crops. *New Jersey Farm and Garden*

* * * *

High Nitrogen Grass Unpalatable — Bromegrass which has been fertilized with a very high rate of nitrogen seems to be unpalatable to cattle, according to experiments now under way at the University of Nebraska College of Agriculture.

The tests show that dairy calves readily will eat grass which has been fertilized with 70 and 140 pounds of nitrogen per acre. But they seem to shun the grass which has been treated with 350 and 740 pounds of nitrogen per acre.

Cattle in the highly fertilized plots have clipped the unfertilized fence row grass closely and seek out the places where the drill missed spreading nitrogen.

Idea of the experiments came from reports of sick and dead cattle which were grazed on oats, hay or pasture with a high nitrate content. Thus far, none of the calves have been sick, but they seem to dislike the high nitrate grass. Scientists co-operating in the tests have detected a fish-like odor in the highly fertilized bromegrass.

Nebraska Extension Service

Pest Control With Insects

Beneficial Bugs Kill Bad Bugs, Control Weeds, Wipe Out Disease

Condensed From Acco Press

Dr. F. C. Bishopp

Assistant Chief, Bureau of Entomology and Plant Quarantine
United States Department of Agriculture

USING good bugs to combat bad ones has proved to be practical in many instances. Then why aren't we making greater use of this biological control method?

A short answer to this question is this: First, biological control often comes about slowly — too slowly to satisfy our demand for prompt and complete results; second, we don't know enough about biological control agents, and how they work under different conditions, to put much dependence on them. Perhaps a third part of the answer is that biological control is operating far more effectively than we really know.

We must remember at the outset that there are always present in our yards, fields and forests many native insects attacking and killing pests of our crops and forests. The work of these beneficial insects and diseases is usually unnoticed or unappreciated. However, it may be sufficient to hold a pest down to a point where a good crop can be made without the use of an insecticide.

Often we credit the weather with checking an outbreak of aphids or other pests when parasites, predators or diseases may have done the job. The weather, however, may have been responsible for the rapid multiplication and effectiveness of these biological eradicators.

Biological Control Agents

Maybe we should define what we mean by biological control agents. First, there are the predators, that is, the insects that suck the life blood out of other insects or devour them bodily. Examples are the lady beetles, golden-eyed lacewings, doodle bugs, mud daubers, dragon flies, ground beetles and wheel bugs. These belong in widely different groups and some of their relatives may be injurious. For instance, the

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destructive Mexican bean beetle is a cousin of the lady beetles.

Second, we mention the parasites. These are the insects that live on or in the body of the pest and ultimately kill it. Some of these are so minute as to live inside insect eggs, others attack the larvae or young and others the adult. Most of the parasitic insects are in the wasp family, many are flies, and a few are in the beetle family.

Diseases are the third group of biological control agents. Insects have diseases just as do plants or people. Some of these are fungi, some bacteria, others viruses and still others, single-celled animals called protozoa. Worms, mainly nematodes, also attack and kill insects.

Predators, parasites and diseases do not confine themselves to pests. Some may strike our friendly insects. For instance, the bacterial diseases, American and European foul brood, destroy many honey bee colonies and must be fought constantly by the beekeeper. Predaceous insects often do not care whether they eat a good bug or a bad one. They may even eat each other!

Some parasites are not very particular what insect they attack, but most of them are rather specialized, host specific, that is, and attack one species or related kinds. Highly specific parasites will die out if they cannot find the special kind of bug they like. This is also true of diseases, although many diseases go into a persistent spore stage when hosts are absent or other conditions are not right. These spores may live for years.

A pest is seldom wiped out by a natural enemy. In fact, if that occurred it would be suicidal because the specialized parasite would completely die out. In general, the abundance of a natural enemy usually follows the abundance of the pest. That is one reason we cannot always depend on the biological control agent. Crops may be almost destroyed before the parasites, predators and diseases catch up with the rapidly multiplying pest.

Using Biological Control

Many of our worst pests are not native to this country. They have slipped in from foreign lands from time to time. Many of them gained entrance before the passage of the Plant Quarantine Act of 1912, but some are still getting by our inspectors.

Most of the foreign invaders get in without their natural enemies and if climatic conditions are favorable they may multiply and spread at a tremendous rate. Some of our native parasites and predators attack them but it is logical to turn to the home country of a pest to find its enemies for introduction into this country. Likewise some of our American

pests get into other countries and give them great concern, as is now happening in Europe with the Colorado potato beetle and the fall webworm.

Pests do not observe political boundaries, and the exchange between nations of beneficial insects with which to meet these common enemies might well be expanded as a step toward improved international relations. Underdeveloped countries are probably in the best position to profit from biological control of pests, as they are not able to practice chemical control as it is carried out in this country.

The United States has been the leader in searching for parasites and predators and introducing them to combat foreign pests that have become established here. Prior to 1888 several parasites were brought in, but it was not until the spectacular success of the vedalia beetle in controlling the cottony cushion scale of California citrus that widespread interest in biological control developed. The vedalia beetle was brought from Australia in 1888 and 1889 when the cottony cushion scale had killed thousands of orange trees and the entire citrus industry was threatened. The pest was stopped short within two years after the beetle was released.

This undertaking was sponsored by Dr. C. V. Riley, chief of what was then the division entomology of the U. S. department of agriculture. Dr. L. O. Howard, Riley's assistant and later, for many years, chief of the bureau of entomology, saw great possibilities in biological control of insect pests and took an active part in bringing into the United States hundreds of different parasites of such pests as the gypsy moth, Japanese beetle, European corn borer, various scale insects and the pink bollworm.

The tremendous agricultural development in California and the occurrence there of many pests of fruit and other crops, together with the farsightedness of the entomologists of that state, have led to an almost continuous search throughout the world for parasites and predators. Hawaii has also been very active in this field and with some striking successes.

Since 1888 more than 400 species of parasites and predators of some 60 pests have been brought in by the U. S. bureau of entomology and plant quarantine and California authorities. More than 100 of these beneficial kinds have become established and some of them are holding serious pests in complete control.

Difficulties in Biological Control

The introduction of beneficial insects is not as simple as it might appear. First, it often involves extensive search in dangerous

tropical jungles and under trying living conditions. Getting the infested plants, securing the fruits, and rearing the parasites is frequently very difficult. Then there is the problem of getting the parasites into this country alive and free from any other pest. Next, is the necessity of rearing the parasites under quarantine conditions to see that they are not accompanied by their enemies (hyperparasites). Before they are released they must be bred up to sufficient numbers to assure a good chance of continued multiplication in the field.

There are frequently serious problems of timing releases so that the pest is in the right stage of development and alternate hosts are at hand when the main host is unavailable. If the parasite is brought from the southern hemisphere the normal seasonal cycle may have to be reversed here.

Parasites, both native and introduced, must also contend with pesticide applications. Highly effective insecticides kill parasites as well as pests, and herbicides may destroy weeds in which alternate hosts of the parasites are developing. Many farm practices such as cleaning up all crop residues may destroy many overwintering parasites. So our friendly insects may have a hard time, but they will survive if they are well adapted to the environment.

Diseases of Insects

Despite the occurence of disease epidemics that sometimes stop-short pest outbreaks, relatively little has been done to utilize this means of pest control. Some effort has been made to identify diseases that are found to be killing insects in nature and feeble attempts have been made to propagate fungous and bacterial diseases and spread them in the fields.

The Canadian government has recently embarked on an extensive study of diseases, especially of forest pests, and successful tests of some of the virus diseases of saw flies have been carried out. The University of California has also been conducting research on diseases of insects. Dr. E. A. Steinhaus of that institution has had some striking results from the distribution, from the air, of a bacterial disease of the alfalfa caterpillar.

The success attained by the bureau of entomology and plant quarantine in the development of the milky-disease method of destroying Japanese beetle grubs in the soil should encourage more work in this field.

The cotton leafworm, bollworm and armyworm are often killed in large numbers by diseases and study of them appears well worth while.

Weed Control By Insects

The control of certain weeds by

insects has been demonstrated in several instances. Probably the most striking case is the wiping out of the cactus which has completely covered hundreds of thousands of acres in Australia. This was accomplished by the introduction from South America of a moth, the caterpillars of which eat into the cactus pads and, along with certain diseases, destroy the entire plants.

In this country we now have a good example of this method of weed control. The so-called Klamath weed has been rendering large range areas in northern California and adjacent states worthless for grazing. The bureau of entomology and plant quarantine introduced two beetles from Australia and one of them in particular has been making great inroads on the weed. Already over 100 square miles have been cleared and grass is coming back.

Parasite Work Under Way

Since 1905 the bureau of entomology and plant quarantine has maintained a parasite introduction service. Foreign stations were operated in Japan and Europe from 1920 to 1940. World War II made necessary the closing of the Japanese station and moving the European station to South America. The station near Paris was reopened in 1946 and the South American one closed.

Parasites of the European corn borer, the omnivorous leaftier, sweet clover weevil, elm scale, European chafer and wheat stem sawfly are being sent to this country from the Paris station. These are being colonized and distributed in co-operation with several state experimental stations.

The biological control work of the bureau is being strengthened as far as possible. The need for more attention to this line of attack is emphasized by the development of strains of insects resistant to insecticides and the desirability of cutting down on the amount of insecticides required.

Although a number of parasites of the pink bollworm and of weevils related to the boll weevil brought in a few years ago did not become established, further efforts along this line are to be undertaken this year. Initial search for pink bollworm enemies is to be made in Africa and India where this pest has been present a long time.

Studies of the effect of insecticides on natural enemies are being given considerable attention by the bureau and by some of the state experiment stations. A fuller knowledge of the way different insecticides affect parasites and predators may indicate how spray schedules or formulations may be changed to do the least harm to those beneficial forms.

Two of the problems facing our American farmers in which parasites are receiving much attention are the oriental fruit fly and the citrus black fly. The former got into Hawaii during World War II and the latter became established in Mexico a few years ago. In our effort to prevent these pests from gaining entrance into this country wide search for parasites has been carried out. In cooperation with the University of California and several agencies in Hawaii about 50 species of parasites were brought in from India, Malaya, China, Borneo, Africa and other parts of the world. Four of these parasites are established in the Hawaiian Islands and the oriental fruit fly is being markedly cut down in numbers.

The citrus black fly which was moving rapidly toward our citrus areas in Texas and California is now being checked by systematic spraying and the introduction of parasites. Seven species were brought in from India and Pakistan. Four of these have become established and are giving promise of a high degree of control.

Beef Cattle

There are four "Overs" that put cattle "Under" with shipping fever: Over-fatigue; over-crowding; over-filling; over-exposure.

* * * *

An estimated 25 million dollars is lost annually as a result of bruises, cripplings and deaths of animals on farms and in transit to market. Most of the loss is borne directly or indirectly by the producer.

* * * *

When feed is scarce, high finish wastes feed. Grain required to put one "choice" feeder steer to "choice" slaughter condition will feed two "choice" feeder steers to "good" slaughter condition. Also when cattle are fed to a high finish, gains are much more expensive during the latter part of the feeding period.

* * * *

Beef cattle numbers in the United States have increased during the past three years. The increases: In 1949, 2.5 per cent; 1950, 9 per cent; 1951, 13 per cent. The 52,300,000 head on hand January 1 this year are 26 per cent above the number reported on January 1, 1949, and an all-time high.

Foolproof Plan for Good Pasture

Wise Use of Fertilizer, Good Seed and Careful Management Give Eight Months of Grazing in Northeast

Claude Eby

Condensed From New Jersey Farm and Garden

DEMONSTRATIONS in every state for the past 20 years have proved beyond question of doubt that well managed pastures are the cheapest form of roughage for dairy cows.

A good pasture program is one that provides all of the green grass that stock can eat from the time they are turned out in the spring until they are brought in in the fall. Any combination of crops that will do this is a good pasture program.

In some sections of the country, much land will continue to be used for permanent pasture that is good for little else but to grow trees. So the problem is to make this land highly profitable in nutrients. A top dressing with lime and fertilizer greatly increases the carrying capacities and improves the quality of the feed. With the establishment of a higher fertility level many weeds and low value grasses give way to blue grass and white clover.

Most permanent pastures include a number of grasses and legumes. In the pastures at the Dairy Research Farm in New Jersey, there are as many as 19 different species, many growing in the same field. However, not all are palatable or productive. Some are productive in early spring or in late fall; others grow close to the ground and are of little value for forage. Probably the greatest difficulty in all these species is that they will not support enough animals during the midsummer months. For instance, Kentucky bluegrass goes into the dormant stage during this time. The plant breeder and agronomist is always on the lookout for species of grasses and legumes which are palatable, drought-resistant, and long lived.

To illustrate how a permanent pasture improvement program works, let's look at one of the farms the Experiment Station obtained in 1931. Very poorly

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Sea Isle City, New Jersey, March, 1952, Issue

farmed for the previous 10 years, this farm was to be used entirely for heifer grazing. The fields were weedy, full of briars, and had only about a 50 per cent stand of grass.

First step was an application of two tons of ground limestone to the acre and 600 pounds of superphosphate. The mowing machine was used frequently to reduce the number of weeds and briars. In subsequent years nitrogen was added as needed, to stimulate the grasses, and potash was added for white clover production. During the summer of 1933, the area contained 5 per cent white clover and by 1938 up to 35 per cent. This was done without any new seed—only by feeding and managing the pasture. In 1946, the area contained 43 per cent native white clover.

The soils of this abandoned farm were good, but through lack of care and disuse the better types of grass and legumes disappeared through the years.

Good Management Important

Young dairy animals ranging in age from one to two years were turned out on these pastures in the spring and removed late in the fall. Rotational grazing has been practiced through the past 15 years and as a pasture becomes grazed down to two or three inches the animals are removed and placed on a fresh pasture. This method insures fresh green grass most of the time. Records have been kept of the number of animals on each pasture and the number of days grazed. From these records pasture credits were determined in 1,000 pound cow days, pounds of nutrients and gain in live weight.

This pasture area contains about 45 acres into which some 60 animals are turned. The heifers are divided into convenient groups for early spring grazing at the rate of about six animals per acre. This means quickly grazing the herbage while it is young and fresh.

After several methods of fertilization were tried, the scheme of limiting or increasing nitrogen to prolong grazing as far as possible in the summer was hit upon. This consisted in supplying 500 pounds per acre of 10-10-10 fertilizer mixture. Two pastures were so treated and considered as extra early grazing. On two favorable years the heifers were turned to pasture on April 25, which is exceedingly early for northern New Jersey. Herds in the neighborhood were not out to pasture until May 20. This means three weeks' saving of barn feed.

Stagger Nitrogen

Two or more other pastures were fertilized with 500 pounds of a 5-10-10 mixture. Several other pastures were fertilized with a 0-10-10 mixture. This method of staggering the nitrogen treat-

ment produced young forage at different times, usually about two to three weeks apart. In other words, the fields receiving no nitrogen were not ready for grazing until the latter part of May or the first of June. When these pastures had been grazed, the heifers were again returned to the nitrogen treated pastures.

In following years the program was switched so acreage which received no nitrogen one year got nitrogen the next. When conditions warranted it, a June application of nitrogen was applied to one or more pastures at the rate of 200 pounds per acre of a nitrogen carrying fertilizer. This helped to stimulate late June and early July growth. If in any year drought occurred from the middle of July on, we found our fertilizer program had reached its limit as far as midsummer production went.

Since bluegrass and white clover provide excellent pasture while growth is rapid, but become more or less dormant in midsummer, combinations of ladino clover and tall grasses have been seeded to tide the animals over. Brome grass, orchard grass, and reed canary grass, in combination with ladino clover, have proved very helpful in extending the grazing period from mid-July through August. Farmers are reporting that high producing cows milk better on ladino-tall grass mixture than on bluegrass-white clover sods. In many sections of the country brome grass and alfalfa make a very desirable and economical pasture mixture for midsummer grazing.

In planning a season pasture program, there is one fact that must be considered—both permanent pastures and ladino-tall grass pastures produce half or more of the total feed for the year in the first third of the grazing season. No one has devised a seed mixture or a fertilizer treatment that will make grass grow at a uniform rate throughout the season. Irrigation plus fertilization will come very close to accomplishing it, and probably on many farms a few years hence, we may be irrigating a few acres of heavily fertilized pasture to provide this much needed summer grass.

In the meantime, though, let's face this problem of handling one-half or more of our grass growth in the first third of the season. It can't be solved by saving our pasture fields until the middle of July, because grazing then is of no more value than straw. On the other hand, uncut or ungrazed grass is quite likely to smother out a good deal of the clover. It is possible to graze lightly or clip high with a mowing machine to retard early growth, thus saving one or more fields for a little later in the season. Ladino clover lends itself

better than most plants to a holdover, because it does not deteriorate with maturity.

It begins to look as if we will not distinguish sharply on many farms between hay and pasture land in the future, but will use fields interchangeably to take best care of the needs of the stock for a particular season.

New Pasture Plants

New pasture plants like brome, orchard, and reed canary, in combination with ladino, are more likely to extend the pasture grazing season than many others we now know about. The old red clover, alsike clover, and timothy mixture is entirely unsatisfactory for the present needs. Alsike clover and timothy usually produce little aftermath, and red clover aftermath comes on too slowly. Besides, these clovers cannot be depended on for more than one year and timothy (under grazing conditions) not more than two or three years.

It is apparent then that we need perennial legumes like alfalfa and ladino clover and more grasses like brome in our meadows. Ladino may not be perfect but it has wide adaptation, recovers quickly after grazing or mowing, and might well be included in practically all seeding mixtures that will be used for grazing. In some sections birdsfoot trefoil shows considerable promise as a pasture and hay legume, but it has some disadvantages in that there is a shortage of seed of the desirable strains and it is rather a tricky crop to establish.

Pasture Cultivation

The three most important pieces of machinery in pasture production are the lime sower, mowing machine, and drag-harrow. Clipping with the mower several times during the pasture season and dragging with a harrow are essential. Regular clipping to keep down weeds and uneaten clumps of grass accomplishes a lot for little money toward improving the stand. Average cost per acre for fertilizing, clipping and dragging of 45 acres of pasture land during a 15 year period amounted to $7 per acre, or about three cents per pound gain of live weight.

Runners Form Dense Mat

The growth habits of ladino are similar to those of white Dutch clover. Many runners extend from the parent plant and, under favorable moisture conditions, take root at the joints. Numerous leaves and flower stems rise erectly from these joints. By the end of the second year, the surface runners have formed a dense mat, single plants commonly occupying two or three square feet. Normally ladino attains a height of 12 to 1 4inches, and under very favorable conditions may reach a height of 18 to

20 inches at maturity.

Experience indicates that rotational grazing is the best type of management, permitting rapid recovery of the clover, with least injury to root stocks. Continuous and close grazing, particularly in midsummer, and late fall grazing, should be avoided.

Grazing of ladino may be controlled by dividing the pasture area into smaller sized paddocks. An electric fence is ideal for this purpose. Under normal conditions of soil fertility, moisture, and age of stand, each cow will require one acre or less for a grazing season of between 140 and 160 days. Early grazing should begin when the plants reach a height of four inches. Since ladino grows rapidly when excess moisture conditions occur, it may be necessary to graze as many as 8 to 10 animal units per acre during the early part of the grazing season.

Young ladino is laxative, and if animals consume much before becoming used to it, they may lose flesh. It is good practice to pasture a fertilized adjacent bluegrass pasture before turning the animal on ladino. Animals fill up quickly on ladino and should be removed at the end of one or two hours' grazing.

Don't Graze Too Early!

Extended grazing should not be permitted until plants have reached a height of 10 to 12 inches, rotating the animals to another pasture when all but the last four inches have been grazed. By this method recovery is rapid, with a minimum of injury to plants. Clipping of ladino pastures may be practiced when ungrazed clumps and weeds appear. Dragging to spread the droppings after the animals have been removed in the fall is beneficial. If an application of manure is to be made, five to six tons applied in late fall are an aid in prolonging the life of the stand.

Very little supplementary grain is necessary, except for cows producing 40 or more pounds of 3.5 per cent milk. By feeding a concentrate containing 12 to 14 per cent protein, at the rate of one pound for each six pounds of 3.5 per cent milk, a normal level of milk production can be maintained. Cows relish a daily feed of dry hay while on ladino pasture.

Turkey poults hatched in March were up about 27 per cent from a year earlier on a national basis. The Bureau of Agricultural Economics forecasted a still greater increase for the April hatch.

Man's Friend — The Barnyard Goose

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Successful Goose Raising

Lewis Glaser

FOR WELL over half a century the goose—man's oldest and one of his most rewarding domesticated fowls—has been in eclipse in the United States. This friendly and self-sufficient bird has all but disappeared from the average farm due to changing eating styles and to the habits of farm folk themselves, who have often shown a tendency toward almost too great concentration upon the chicken and turkey markets.

Today, however, the domestic or "barnyard" goose—*Anser domesticus* to the scientist— is on the threshold of a brilliant future. The recent war and its aftermath has brought to the attention of the American people the extraordinary economic possibilities in this interesting and useful waterfowl. Modern breeding, incubating and marketing methods have opened new horizons to the goose raiser. And there is reason to believe that, in the years ahead, the succulent goose may become as familiar a figure in the American barnyard—and on the American dining table — as it has been throughout history in most of the other civilized countries of the world.

In Europe for many centuries the goose has been appreciated because of the ease and cheapness of its production; the distinctive flavor and richness of its meat; the unique physical and chemical properties of its liver; the value of its feathers and down, and the esthetic charm woven about it. The goose has been the subject of innumerable quaint stories and phrases used by writers, philosophers and common folk. It is traditionally looked upon not only as a domestic animal but frequently as a companion and member of the household. The references to it in all literature are simply an endorsement of its presence among its human friends.

Geese adapt themselves better to general farming than to large range specialization as with turkeys, chickens or ducks. Geese can be kept easily with livestock and poultry on the same farm.

They live long; are hardy and self-reliant; can do with simple inexpensive housing, and with reasonable care and feeding are free from ailments, diseases and parasites. Once established, a set of geese—a group consisting of a male with one or more females—normally needs no change in mating from year to year. Geese require less personal attention than cows, sheep, goats, swine, chickens, turkeys, ducks or pigeons. Properly managed, the profit from a flock of geese is remarkably high.

Goslings make their growth on pasture grasses and legumes, and can thus be raised more economically than birds which require grain feeding. They can be prepared and marketed as broilers, or sold as green geese at 12 to 16 weeks. Goslings not intended for use as breeders can be confined to a small area and fattened for market. When kept in enclosures, they do not require pasture or swimming facilities inasmuch as their feed and drink are brought to them. A set of two with about six goslings can be reared successfully on a plot as small as one-fourth acre.

In addition to keeping geese on a general farm or country place and permitting them the freedom to gather their sustenance, there are several branches of the goose industry open to the producer wishing to specialize. The size of his project can grow according to his facilities and his inclination. The beginner, particularly the city man who has no experience with poultry, should start on a small scale, preferably with one or two sets of the same breed, obtain knowledge and experience, and enlarge the enterprise on a foundation of profit and experience. Literature can be helpful but there is no substitute for actual practice. Goose raising offers many diversified opportunities for pleasure and profit. For example:

1. *Keeping geese.* (a) For ornament, interest and amusement; (b) controlling weeds and rapid growing grass on chicken ranges; (c) consuming windfalls from fruit trees and grape vines; (d) in orchards, groves, vineyards, cotton and corn fields for weed control and fertilization; (e) as "watchdogs," as they have an uncanny ability to warn of the approach of strangers.

2. *Breeding.* (a) Purebred geese for own use; (b) sale of purebred stock for breeding purposes; (c) sale of eggs for hatching purposes.

3. *Marketing.* (a) Crossbred goslings as broilers or green geese; (b) fattened geese to private customers or to live poultry markets.

4. *Processing.* Fattened geese for own household; (b) marketing drawn carcases, retaining the

liver, fat, breast; (d) sale or processing of feathers and down; (e) sale of goose quills for art and calligraphy.

The choice of breed best suited to the goose producer or general farmer may be found among the Embden, Toulouse, White China, Brown China, African and Roman. These are the standard industrial breeds. There are other breeds on the American scene, like the Brown Buff, Sebastopol and Pilgrim, but this group is more suited to the hobbyist. The white plumaged Embden, White China and Roman hold a predominant position. The Embden, a member of the heavy group of European origin, is the most popular breed in Europe, where it occupies the same position in the goose industry as does the Pekin in the American duck industry. European producers of Germany, England and Holland have combined to develop the Embden to be the largest and heaviest breed in Europe, bringing its standard weight to 26 pounds.

The Toulouse goose is second to the European Embden in importance and is used widely for the production of cross-breds for the market. It is almost as large as the purebred Embden, the European standard being slightly less than 26 pounds.

When making a breed selection one should be guided by several considerations. He must decide, among other things, whether he wants a breed of small or large size, white or colored plumage, and whether he wishes to market green or fattened geese. If he is limited in space, he will find it advisable to select but one breed and specialize with it. If he has unlimited space he may wish to maintain more than one breed. Since the American market is large for breeding and market geese, he will experience no difficulty in disposing of his birds provided they are properly bred and finished.

For more than a year now the barnyard goose has been getting a particularly good press in the newspapers, magazines, radio and television. This is as it should be. There is no reason whatsoever why geese should not be raised in great numbers. Our country with its enormous population can easily support an annual production of 75 million birds. When this millennium is reached, the producers of geese—like today's pioneers in the field—will still be able to market profitably "every part but the honk."

You are not paid to "keep" cows, you are paid to produce milk or meat.

Red Clover Stages a Comeback

Condensed From Capper's Farmer

J. Ross Fleetwood and R. R. Thomasson

University of Missouri

ALBERT SCHINDLER'S 20 acres of red clover that made 82 tons of hay illustrates a trend on Missouri farms to larger acreages and higher yields of the crop that long has been a mark of good farming. The fact that 12 or 15 years ago Schindler couldn't grow red clover on his Boone county, Putnam silt loam fits into the state-wide picture also. In recent years he, along with thousands of other Missouri farmers, has used the lime, raw rock phosphate and high grade mixed fertilizer necessary to re-establish red clover as a dependable source of excellent hay and pasture.

While Schindler has changed the picture on his farm from red clover failures to a crop of four tons to the acre, red clover acreage in the state has nearly doubled. It was 450,000 acres in 1940 and 896,000 acres in 1950. An increase of 115,000 acres occurred from 1930 to 1940. The annual trend also continues upward.

One has only to drive down a farm - to - market road in June, when a red clover field can be spotted as far as the eye can see, to know that there is as great an improvement in stand and yield as in acreage. Time was when it was almost impossible to find a really good stand. Now these pink blossomed promises of well filled hay mows are in evidence at every turn in the road.

Farmers always have valued red clover as a hay and pasture crop and as a soil builder. They have liked the ready cash from the seed crop, too. Missouri ranked first among the states as a producer of this seed in 1950. She came up from ninth place for the period, 1939 to 1948, to third in 1949. Then she topped the list with a 330,000 bushel crop, valued at five million dollars.

Neither Schindler nor his fellow Missourians ever lost their appreciation for and love of red clover. They simply lost heart at seeing their stands wither away

Reprinted by permission from Capper's Farmer
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under the first hot dry spell. They turned to soybeans and lespedeza not so much from choice as from necessity. While both these crops have won a firm position on Missouri farms, they are not capable of replacing the red clover in a two year rotation.

Increase in red clover has not been at the expense of other legumes; quite the contrary. Combined acreage of all legumes has gone up from 7,831,000 in 1940 to 13,362,000 in 1950.

Fifty years ago red clover was the major legume in the state. It was the only legume hay except alfalfa, and virtually the only legume used as a green manure crop. About 1920 difficulty in growing it developed on one farm after another. Some people blamed the weather. Others looked elsewhere for a cause.

At about that time county agents came on the scene. They set up numerous farm demonstrations to show the value of ground limestone and fertilizer, largely phosphate, in growing red clover. Check strips, producing only weeds, across fields of luxuriant clover told a story so forcibly that it was difficult for anyone to ignore it.

Farmers in groups and individually visited these fields and compared notes on their own experiences. Threshing crews saw the clover in the stubble fields and asked questions. Slowly it became apparent to most of the better farmers that the lime and phosphate of the virgin soil had been pretty well used up. But it was more than a one season task to get this basic fact generally understood.

In the early 1920's two young agronomists with the Missouri Extension Service, P. F. Schowengerdt and C. E. Carter, decided that the situation called for evangelistic tactics. They filled a truck with exhibit material and struck out to hold a series of open air "clover and prosperity" meetings. The idea caught the popular imagination and "clover and prosperity" conferences became annual winter events.

Today these meetings, with attendance ranging up to several hundred farmers, are held throughout Missouri under the name of "Soils and Crops Conferences." It is here that extension agronomists report on experimental work and farmers tell of their experiences. Red clover is again occupying an important place in the discussions. Bumper yields of red clover hay and seed vie with reports on ladino, trefoil and other newer crops. But it has been an uphill battle.

Introduction of Korean lespedeza slowed down the movement back to red clover. Though lespedeza was a godsend and stood between many farmers and bank-

ruptcy, it also led some people to the erroneous conclusion that they need no longer be concerned over red clover failures. But a faithful few continued to use lime and fertilizer; and to leave an occasional check strip where weeds grew and red clover died. The impact of those check strips has had a cumulative effect.

The progress may be told statistically. In 1930, Missouri farmers used somewhat less than a quarter million tons of ground limestone. By 1940 the figure was 1,385,000 tons and in 1950 it was nearly three million tons.

While fertilizer usage is not so large, it is fully as significant. From 58,000 tons in 1930, the rate had increased to 87,000 tons in 1940. The decade from 1940 to 1950 saw the figure skyrocket to 407,000 tons. Raw rock phosphate has been slower gaining a foothold. From an insignificant amount 20 years ago the annual rate of application had built up to 100,000 tons in 1950. With numerous distribution plants prepared to do custom spreading, the use of raw rock phosphate promises to continue upward at a rapid rate.

Re-establishment of red clover in the cropping system has been worth all the effort. The legume in a two year rotation with a small grain provides a hay crop that is hard to beat, and two cash crops—one from grain and one from clover seed. It is especially valuable on land that does not grow alfalfa successfully. This includes an extensive area of clay and hardpan soils.

While sweet clover, alfalfa, lespedeza and ladino clover, all have their place in the modern pasture-livestock, balanced farming plan of operation, neither any one nor all of them can take the place of red clover.

Rolla Baugher, county agent of Caldwell county, gives the experience of Sterling Shaw as an example of the value of red clover as a hog pasture. In February Shaw moved his farrowing houses with 15 sows onto red clover pasture a week before farrowing. It was fresh pasture free of worms and parasites. Farmers attending a tour on April 20 saw the 15 sows with 125 pigs on the 40 acre red clover field. They were still running on red clover August 15 when another group of farmers attending the Caldwell county Balanced Farming Field Day inspected the layout. On October 4 Shaw sold 59 head at six months of age averaging 222 pounds. The red clover pasture had produced very economical gains.

Post preservatives can mean as much as 20 years' more service for fence posts. Farmers can make preservative treatments on posts for 30 cents or less.

Raise Every Pig Farrowed

Condensed From The American Hampshire Herdsman

Robert O. Nesheim

PROFITS from raising hogs are largely determined by the number of pigs you market, the cost of raising those pigs to market weight, and the price that you receive for them.

Various estimates indicate that between one-fourth and one-third of all pigs farrowed die before they are weaned. This represents a critical waste of feed as well as a staggering loss of potential profits. Each pig lost at birth represents a cost of around 100 pounds of feed that must be charged against the pigs that are marketed. I think we are all inclined to overlook the seriousness of this loss and pass it off as just part of the risk of raising hogs. A little pencil pushing here indicates just how staggering these losses are.

For example, in 1951 approximately 102 million hogs were raised. Assuming that 30 per cent of the pigs farrowed were lost prior to weaning, approximately 147 million pigs were actually farrowed in 1951, or in other words, 45 million pigs died before they were 8 weeks old. These 45 million pigs represent a feed loss in terms of corn of around 90 million bushels. This figure is equal to almost 6 per cent of the corn fed to hogs in 1951. Enough feed was lost in these pigs to actually feed eight million more pigs from weaning to market. What industry can continue to stand losses like these and be profitable?

What Does This Mean to the Average Hog Producer

Let's translate these figures into everyday terms. If you are an average hog producer with a breeding herd of 20 sows, you saved approximately 130 pigs in your spring farrowing season or 6.5 pigs per litter. You lost 56 pigs between farrowing and weaning and most likely 38 of those were dead before they were three days old. These pigs represent a cost of 110 bushels of corn or approximately five and one-half bushels of corn per litter farrowed that must be charged against the remaining pigs that are marketed.

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Peoria, Illinois, March, 1952 Issue

When you market your pigs a ten dollar bill for each litter farrowed must go for paying for these pig losses.

What Do These Losses Represent in Terms of Lost Potential Profits?

The number of pigs marketed per litter exerts a profound influence on your profits. Here are a few figures to roughly illustrate this.

1. *Five pigs marketed per litter.*
   1,600 lbs. feed for sow and litter during gestation and lactation.
   3,500 lbs. feed for pigs from weaning to market
   5,100 lbs. feed at 4c a lb. — feed cost of $204
   Other costs (feed represents 85% of cost) 36
   Total cost of raising 5 pigs to market $240
   Market value of 5 hogs, 240 lbs., at $20/cwt ... 240
   Profit .. 00
2. *Six pigs marketed per litter.*
   1,600 lbs. feed for sow and litter during gestation and lactation.
   4,200 lbs. feed for 6 pigs from weaning to market.
   5,800 lbs. feed at 4c a lb. — feed cost of $232
   Other costs (feed represents 85% of cost) 41
   Total cost of raising 6 pigs to market $273
   Market value of 6 pigs, 240 lbs., at $20/cwt ... 288
   Profit ..$ 15
3. *Nine pigs marketed per litter.*
   1,600 lbs. feed for sow and litter during gestation and lactation.
   6,300 lbs. feed for 9 pigs from weaning to market.
   7,900 lbs. feed at 4c a lb. — feed cost of $316
   Other costs (feed represents 85% of cost) 56
   Total cost of raising 9 pigs to market $372
   Market value of 9 pigs, 240 lbs., at $20/cwt ... 432
   Profit ..$ 60

One nine pig litter is equal in profits to 4 six pig litters. Raising the pigs farrowed is important.

Management a Factor in Reducing Pig Losses

A combination of proper breeding, feeding and management is necessary to cut pig losses. Probably the most important factor in reducing pig losses is to farrow heavy, vigorous pigs. A three pound pig at birth has six times as much chance to survive as a 1.5 pound pig. Here, proper selection of breeding stock, and the best feeding plays a most important role. Careful attention should be given to the feeding of the pregnant sow during the entire gestation period to insure that your pigs are born to live.

What Can You Do?

The proper care at farrowing time is also very important. Prior to farrowing, see to it that the

sow is provided with a clean, dry, properly bedded farrowing pen of adequate size. A pen at least 7x7 feet is recommended for gilts and 8x8 for sows. The preparation of the farrowing pen should be started early so as to be ready for the first sows that farrow. Place the sow in her farrowing pen at least three days prior to farrowing so that she will be accustomed to her quarters. Equip the pen with guard rails and a heat lamp. Providing heat at farrowing time has resulted in the saving of 1-1½ pigs per litter. Be sure the sow is not mangy so she will expose her pigs.

At farrowing time be on hand to render any necessary assistance. Time spent with a sow at farrowing is usually well rewarded through pigs saved. Dry off the pigs, especially in cold weather, and place them under the heat lamp to see that they are kept warm. It is estimated that over three million pigs are lost annually due to chilling. Be sure all pigs have had an opportunity to nurse before you leave. Even up litters when possible. Clip the needle teeth, being careful to avoid injuring the pig's jaws, thus providing an avenue for infection to enter. For the same reason, paint the navel with iodine. Ear notch the pigs so you can pick your breeding stock from strong, vigorous, large litters at birth that have developed rapidly to weaning and toward market. Don't depend on your memory. Keep records.

After farrowing keep the farrowing pen clean and dry. Aid weak pigs to get started by making certain that they nurse. If necessary help them by giving them a couple of teaspoonfuls of equal parts corn syrup and water every few hours until they nurse readily. This is also a helpful procedure to use when sows are slow coming into milk. Provide the sow with plenty of fresh water. Feed only two pounds of ration the day following farrowing and increase at the rate of one-half to one pound per day until on full feed. This procedure is helpful in keeping the sow on feed and preventing scouring by the pigs.

Prevent Anemia in Nursing Pigs

Take steps to prevent the development of anemia in the suckling pigs. If pigs are farrowed indoors and are not given access to dirt or treated with iron and copper, anemia will develop. Usually the fastest growing, most vigorous pigs are the first affected as they rapidly use up their iron and copper stores.

The development of this type of anemia in suckling pigs is entirely due to faulty management. An anemic pig is a hidden tax on potential profits even though the pigs may be well fed from then until marketed. He is susceptible to scours and other diseases and is

off to a poor start. Death losses in anemic pigs have often been 20 times as great as in normal pigs. A pig may be anemic without showing the usual symptoms of thickened, wrinkled skin, listlessness and thumping.

Prevention of anemia is entirely a matter of management. If suckling pigs are going to be kept inside without access to dirt for more than one week after farrowing, the necessary iron and copper should be provided. This may be accomplished by providing some clean sod sprinkled with ferrous sulfate where the pigs can root in it or by making a solution of ferrous sulfate and either painting the sow's udder with it daily or drenching each pig with it at least twice a week. Treatment should be started by the third day after farrowing and should continue until the pigs are eating sufficient feed to obtain the necessary iron and copper, usually by four weeks of age.

Management of the Young Pig

I like the 4-6-8-10 formula as a guide to proper management of young pigs. Castrate males prior to four weeks of age, vaccinate, if using serum and virus, by six weeks of age, wean at eight weeks and worm at 10 weeks of age if necessary.

By two weeks of age provide a creep for the pigs in a corner of the farrowing pen. If the pigs are running together in a group, provide a creep near the area where sows are fed. If the weather is bad, a creep in the sleeping quarters is more attractive to the pigs. A heat lamp hanging in the creep will help to attract the pigs. The little extra effort it takes to provide a proper creep is well worth while. Sows tend to increase in milk production through about the third week after farrowing, after which they gradually decline in production. The pigs are growing larger each day and require more feed if they are going to make maximum growth. Feed the pigs a good pig starter during this time. Rations commonly used for weaning pigs will not do as good a job as will a special pig starter, in our experience. Here are some interesting comparisons between using an excellent weaning pig ration in the creep and using pig starter feed.

Pigs fed the weanling pig ration in the creep weighed an average of 34 pounds at eight weeks of age with an average of nine pigs weaned per litter. The pigs getting the pig starter ration averaged 45 pounds at weaning with an average of 9.8 pigs per litter. Each litter receiving this pig starter weighed over 400 pounds at eight weeks of age.

Here is an even more interesting part of these experiments. We broke the pigs down into weight groups based on their birth weights and compared the wean-

ing weights of pigs fed these two different feeds. The following table summarizes the results:

Effect of creep ration fed on weaning weights of pigs grouped by birth weights.

Birth Weight	Ration fed in Creep	
	Weanling pig ration 56 day weight Lbs.	Pig Starter ration 56 day weight Lbs.
Under 2.0 lbs...	24	38
" 2.5 lbs...	29	41
" 3.0 lbs...	34	43
" 3.5 lbs. ..	37	45
4.0 or over	42	47

It is interesting to note the big boost that the smaller pigs received. Increased uniformity of the pigs has been consistently noticed in the groups receiving a pig starter.

Another interesting comparison from the same experiments is shown in the following table.

Effect of creep ration fed on per cent of pigs weaned at various weights.

56 day Weight of pigs	tation fed in creep	
	Weanling Pig ration	Pig Starter ration
Under 30 lbs. .	32.7%	4.2%
30-35 lbs.	20.3	8.3
35-40 lbs.	26.6	14.6
40-45 lbs.	16.6	20.8
45-50 lbs.	3.8	20.9
45-50 lbs.	3.8	22.9
55-60 lbs.	—	8.3

These figures clearly demonstrate the importance of creep feeding the proper ration to obtain heavier pigs at weaning time. These heavier weaning weights are important in overcoming many of your post-weaning problems.

Avoid Setbacks

The basis of the recommendations for castration by the time the pigs are four weeks of age, and vaccination by six weeks of age, with weaning at eight weeks of age is that if these operations are carried out one at a time they will produce little setback in the pigs. If pigs are weaned and castrated at the same time, a double shock is given the pig and he may be weakened enough to allow some disease to set in that otherwise could not have gained a foothold. Vaccination prior to six weeks of age allows the pigs to be over any effects from it before they are weaned. Many of these so-called serum breaks that follow vaccination may be the result of faulty management weakening the pigs sufficiently to allow other diseases to take over.

Importance of Proper Sanitation

Feed makes up approximately 85 per cent of the cost of raising hogs. Therefore, anything that can be done to reduce this cost will have an effect on increasing returns from hogs. Proper feeding of a complete and well balanced ration is essential. How-

ever, to get the most out of your feed and feeding program, your swine herd must be maintained in a good state of health. A sound, well planned sanitation program religiously carried out is the basis of swine health. The McLean County System of Swine Sanitation has effectively demonstrated the benefits to be derived.

This simple, four-step program involves:

1. A clean farrowing pen.
2. A clean sow.
3. Removal of sow and litter to clean ground.
4. Leaving them on clean ground until at least four months of age.

These four simple steps have been shown to return these advantages over the wormy, filthy way of raising hogs.

1. Marketing of two extra pigs per litter.
2. One-fourth less feed required per hundred pounds of gain.
3. Seventeen per cent fewer runts.
4. Pigs averaging 41 per cent heavier at the same age.

Controlling the Roundworm

The McLean County System of Swine Sanitation has been proved as the way to control roundworm infestation in hogs. Wormy pigs are damming evidence of a sloppy job of sanitation. It is estimated that from one-third to three fourths of the hogs raised in the United States are moderately to heavily infested with worms. Veterinarians tell us that in a herd of hogs moderately infested with worms, one out of every four ears of corn fed to the hogs goes to feed the worms. A very effective way to worm hogs is to mix one part of sodium fluoride with 99 parts of dry ground feed and feed it to the pigs for one day. Never feed as a slop and only feed for one day. This treatment is 95-100 per cent effective in expelling the common roundworm. However, it should be kept in mind that the damage from the worms has already been done by the time you expel them. Prevention is far more effective.

Doing the Job of Sanitation

An effective method of cleaning the farrowing pen and equipment is to scrub it with boiling lye water using one can of lye to approximately 30 gallons of water. If you have a steam cleaner available, it is also a very effective means of cleaning a pen or equipment.

Wash down the sow with soap and water before bringing her into the pen to remove worm eggs and other dirt. Don't let the sow be the carrier of disease and parasites to your pigs.

When moving the pigs to clean pasture or lots, avoid driving them through infested areas. Avoid exposure to sources of disease and parasites.

Leave the pigs on clean pasture or clean ground until at least four

months old, preferably until marketed. Rotation pastures make ideal swine pastures. The cultivation of the ground for crops is an ideal way to render it clean of infective organisms. Avoid using old barn lots, as they are hotbeds of infection. They may be the one leak in your otherwise sound sanitation program. A good sanitation program makes maximum use of pasture. In this way the nutritional and feed saving benefits of pasture are added to the savings from better sanitation.

Sanitation is also effective in the control of swine ills other than worm infestations. A program such as outlined is the backbone of defense against such diseases as enteritis, erysipelas, brucellosis, etc. Much has been written about the effectiveness of antibiotics in overcoming many swine diseases and in straightening out runt pigs. Effective as antibiotics are, they cannot be relied upon to take the place of sound feeding and sanitation.

It is far more economical to prevent runts than to cure them, as the feed they have wasted and the time lost in getting them to market can never be made up. The goal of every hog producer should be to raise every pig that is farrowed and to work toward that goal in every reasonable and practical way.

Horsemeat Becomes More Popular on European Dinner Tables — Prices of choice horsemeat cuts in Britain have soared from 10c a pound in 1950 to more than $1 a pound—not far from the $1.50 which off-ration black market beefsteak brings. Belgian meat dealers inform suppliers in Eire they'll buy all the Irish horsemeat they can get. France imported twice as many nags for human consumption last year as in 1950.

The reasons for the boom in horse steaks: In Britain it's the skimpy meat ration; elsewhere it's the high price of other meats.

The Wall Street Journal

* * * *

Farmers using rotary hoe equipped tractors have reduced the cotton hoeing and chopping bill by as much as 60 per cent. Cross-cultivation and mechanical cotton choppers have also been used to cut hoeing and chopping costs. The latest weed and grass control research is with chemicals.

Texas A. & M. College

The Herd Sire Problem

With a Little Luck, You Might Build a Breeding Herd in 35 Years

Henry B. Mosle

Condensed From The Ayrshire Digest

KNOW what you want before you buy a bull. A bull has limitations. In the first place, his opportunity is limited by the cows to which he is bred. In general, he can carry his offspring only half way from their point of origin, namely, the genetic capacity of their dams, to his own genetic level.

If a bull is not as good as the dams he is bred to, no breeder wants him. If he is better than the dams he is bred to, none of his daughters, on the average, will be as good as he is. You can intensively inbreed to a good bull if you want to but even then you can not, theoretically, ever bring the group of his descendants up to his genetic level, because all you do in the successive generations is to halve the distance left to travel. Intense inbreeding of this kind has its hazards: The possibility that lethal factors will turn up, the intensification of undesirable features and so on.

How can you pick or where can you find a bull that will carry your herd onto new high ground, onto ground higher than the genetic level of your existing herd sire? That is the $64 question.

Unless yours is one of the top herds of the breed, it ought, with sufficient study, to be possible to locate in a number of herds suitable young herd sires, provided the composite three generation picture indicates definite possibilities. The chief factor here is to evaluate environment correctly and, unless you know the farm and conditions under which records are made, this is very difficult. A look at the three generation pedigree averages out a good many special situations and is worth while for that reason.

Or you can use artificial insemination, provided that there are available to you bulls in the stud that are better, or appear to be better, than the genetic level of your own herd. Such a bull, mated to an approved matron in your herd whose daughters' aver-

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Brandon, Vermont, March, 1952

age exceeds the genetic level of your own herd, might provide you with a good youngster who would combine some value better with the good already in your herd. This is the reasoning behind all line breeding programs. By itself, line breeding is valueless. Used as a hedge on an unknown quantity (the young bull you are trying out), it is both inhibiting and promising—inhibiting since it ties you down more or less to the level you have already reached; and promising, since, if it works, it may give you a valuable clue to an area or cow family in which you can seek another bull that will continue the slow, upward movement of the genetic level of your herd.

Real progress is always slow. There may be some retrogression in a good breeding program from levels previously attained. The most valuable weapon in the breeders' arsenal is still his ability to cull. There is a drag in any breed and in every herd back toward the breed or herd average.

If you cull for individual high production, which seems easy, you handicap succeeding sires, because you are culling out cows that may be genetically better than some that you retain. In other words, it may be an individual, non-transmissable factor which accounts for an animal's high production, rather than genetic, transmittable factors. In the same way, an individual non-transmissable factor may account for *low* production in a cow with *high* productive level. The answer to which it is lies in the cow family—in the ancestors, and sisters or brothers and in the offspring. Any study of cow families will exhibit those individuals that are better than the level of their family and transmit along these lines. The first of these cows, if the level is good enough, is the obvious choice for the dam of your next herd sire, whereas the second cow and her daughters are candidates for the butcher.

The bull whose daughters advance production two or three thousand pounds over their dams ought to be examined very carefully before a son is selected to head your herd. Very often such cases are the result of a change in environmental factors rather than an indication of genetic excellence. Even when it is genetic excellence, you are faced with a second problem: Will a son contribute more of the genetic influence of the sire or of his inferior dam? Fifty per cent of the inheritance of both sire and dam are thrown away in every mating and the dominant factors in a mixed mating of this kind may or may not be the desired characteristics.

It is much safer to take a bull from a sire who has shown the ability to sustain high production, whether the production of his daughters is or is not better than

that of their dams. In this instance, any 50 per cent of either inheritance is more likely to be desirable.

We sometimes hear arguments about the relative merits of outcross as against line-breeding of various intensities. Every breeder wants to retain as much of what is good in his herd as possible and at the same time acquire something better. Sometimes it may be desirable to retain what you have, hedge, as it were, against a cold out-cross experiment, by line-breeding to some extent. Or, again, in a line-breeding program it may be desirable to get in some new blood. In line-breeding your operations can not exceed beyond the capabilities of your best animals, unless you get a mutation. The mathematical probabilities against this are so great (and against it being a desirable one, even greater) that it does not pay to count on this variety of miracle.

Which system you want to follow comes from a study of your herd. If it is sufficiently mixed in its inheritance so that the good is well scattered among a number of cow families not closely related, it may be that the best bull you can use can be obtained in your own herd. In this instance you have the advantage of knowing exactly what the conditions were under which comparable records were made. On the other hand, the level within your own herd may not be good enough, or there may be undesirable characteristics, in which case an outcross may be your best answer. The problem is individual, and its exact dimensions can only be determined by an exhaustive study of your own herd. It is better to make a few mistakes by following an essentially sound program than it is to have the luck to be right just once.

Genuine herd improvement is a slow process. You cannot do it with one bull. You can not do it in 10 years. You have to be more often right than wrong. You have to cull intelligently, by families or groups, rather than individuals. On the average you have to use bulls better than the genetic value of your herd. You have to take some chances, not blindly, but because when all of the evidence has been examined, that chance must look more promising than any certainty of which you know.

If you have a lot of money you can perhaps buy the better kind of bull, the already proven sire; and this is very worth while. When I first started I asked Mr. Alex Cochrane how long, in his opinion, it would take, starting from scratch, to build a good breeding herd of Ayrshires. After a little thought he replied:

"I don't know, but if a man were careful and lucky, he just might do it in 35 years.'

Plain Detergents May Improve Butterfat Test

Experiments Show New Products Can Do as Good a Job as Acid

Lewis C. French

Condensed From The Milwaukee Journal

FOR THE first time since Dr. Stephen Moulton Babcock fashioned his butterfat tester at the University of Wisconsin in 1890, there is now promised a major improvement in the test to measure cream or butterfat content.

In the dairy products research division of the United States department of agriculture, technicians are convinced that common detergents used in new cleaning compounds work better than scarce, dangerous sulphuric acid —still standard in the Babcock test.

After more than a year's testing, the laboratory men say that a drop or so of the fat separating detergents, plus alcohol, works as well as the acid or the ether used in the more costly and complicated Roese-Gottlieb or Mojonnier tests for measuring butterfat.

Mixed up in a simple formula, the "soap" works. Countless tests show that it measures out both low and high fat milk with great accuracy on a standard scaled test bottle.

"We want to get all the bugs out of the detergent process," says George E. Holm, Washington, D. C., chief of the dairy research laboratories division. "While our laboratory technicians can make it work perfectly, we want to know if the testers in the dairy plants, DHIA labs, schools and farms get the same standard results. The next step is for widespread field tests."

Rises After Whirling

The tip that low cost detergents release oils when used as a laundry wetting agent came not from milk but from human blood.

Dr. Phillip Schain of the laboratory service of the veterans' administration, Staten island, New York, used the products successfully to separate the minute amounts of fat in blood. He went ahead with the medical phase research, but did some experimenting with milk.

The agriculture department re-

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Milwaukee, Wisconsin

search staff took up the tests quietly. O. S. Sager, J. P. Sanders, F. M. Grant and T. H. Hammond, the laboratory technicians, worked out the formulas and practical application.

Babcock, the master, whittled out the parts of his tester and forged the rest. He put milk samples into small vials and whirled them centrifugally to cause the cream to rise to a narrow neck of the test bottle. There the percentage of the cream could be read off from an etched scale. To release the butterfat from the milk fluids, he used sulphuric acid. The Germans with their Roese - Gottlieb test used ether. Both products are rather costly and dangerous, especially in the hands of untrained testers.

Sometimes Disputable

Now it is found that the detergents break the emulsion involving the globules of butterfat just as well, releasing them to rise.

One of the difficulties of the Babcock test is consideration of the variables in reading the scale. With milk prices based on butterfat content, especially in the dairy processing markets, the butterfat test is a controversial point between the farmer-producer and the dairy plant that buys the milk. The farmer seldom is satisfied with the way the buyer reads the test.

In the Babcock test, surface tensions in the butterfat that has risen to the narrow measuring neck of the test bottle cause it to be cupped at top and bottom. These crescent shaped "meniscuses" are not flat for sure reading by the scale. The more careful tester, to avoid the wrath of the farmer or his employer, levels off the fat with oil. At best, it is a rather tricky process to measure the fat content with absolute accuracy.

The detergents, made into a formula with water and alcohol, work fast to release the cream. Whirled in a Babcock machine, it flattens or levels off at the bottom of the cream sample. By pouring in a drop of the formula to break that "cuplike dip" at the top, you get a flat surface and do not have to guess the final fractional points . . . just read them on the scale, the last tenth.

Early Demonstration Told

With detergents, it is not necessary to use the centrifugal whirling. The cream will rise in the test bottle when put in cold water and left for a few minutes. But it works faster when whirled.

Every housewife and laundryman knows of detergents. This reporter recalls first hearing about them during the national convention of the American Chemical society in Milwaukee. At a lecture on their introduction as a wetting agent, a few drops were added to wash water. It thoroughly soaked such water resistant fibers as wool.

Proving his point, the lecturer took a fat duck floating in a huge glass of water. He poured in a little of the new compounds. Almost instantly, the product took off the natural oils of the duck's feathers — natural waterproofing. In a few seconds the duck could not stay afloat no matter how fast it paddled its web feet. The duck had to be rescued from drowning.

Much the same thing happens chemically when the detergents are introduced to milk samples. The detergents almost instantly release the fat of the cream.

Safer Than Acid

Butterfat testing is done in every dairy plant in the United States, everywhere farmers sell milk on commercial markets. Two samples often are taken and tested from every farm shipment; one by the dealer for computing the milk checks and the other sample by the milk producer's association, the co-operative running the test for the shippers. Then the two tests are compared to keep buyers and sellers satisfied.

Besides these tests, many agricultural students test milk in classwork and the Dairy Herd Improvement Association (DHIA) tests are run on the farms. Fieldmen use portable testers to show the farmer the production of his cattle. About 2,500 tons of sulphuric acid a year are needed for these millions of tests. The costs of the detergents, compared with costs of the acid or the ether tests, run into important money.

There are other advantages. With detergents you do not have to be so careful. The acid burns if spilled on flesh; ether explodes. Many a dairy tester has been crippled from accidents with both.

After tests are finished, just a swish of the compound is needed and the sample run out. A rinse in clean water completes the washing. With acids, there are hours of brushing and washing, cleaning the hundreds of not easy to clean test bottles.

Spreading out for the field tests on detergents, the federal department next is going to try out detergents to measure the cream content on manufactured dairy products, such as cheese, ice cream and canned milk.

They hope to reduce costs and time on these fat tests involving food standard regulations.

"We know of no reason why it will not work, but we are not going to present the detergents even on butterfat tests on fluid or whole milk until we are more fully satisfied," said Holm. He cited a number of cases of outside interests jumping the gun on developments undergoing thorough research test.

This summer, the dairy products division is going to find out if the results achieved in Washington are reproducable over the country.

Soil Organic Matter Feeds Plants and People

A Challenge for Future Research

Wm. A. Albrecht

Chairman, Department of Soils, University of Missouri

THE DECLINING numbers of acres left to grow crops, and the dwindling supply of soil fertility, are bringing us to the necessity to fertilize our soils more. The tonnage of barnyard manure has long been insignificant as fertilizer supply. We still insist on manure for our gardens. But in them we are more concerned about the soil in relation to the quality delivered in the foods for ourselves than we are concerned about such in the field giving feed for our animals. While most of us eat for the sake of our good nutrition for good health, we are still apt to consider our livestock mainly as labor-saving, crop-harvesting machinery.

The problem of purchased and imported protein materials as supplements to the deficient supplies which our own soils will grow for us has too long been viewed mainly as an economic one. Instead, the deficient soil fertility, now failing to help our own crops make enough protein, should have brought us to realize what really provokes the troublesome economies. We are gradually coming to realize the basic facts now that our soils are being rapidly "worn out" because of our concept of them as a range or pasture rather than as a feed-lot, and because we can still grow crops for sale even if they are not crops to nourish our animals completely.

Organic matter in the form of animal and green manures, and of the accumulated virgin soil supplies has always been the highly desired fertility for growing our crops and for them in turn to feed well our farm animals and ourselves. Now that we have mined the original organic matter supply (to say nothing of the inorganic) more than we have managed to maintain it, we are debating the question whether we can produce good foods and feeds in our crops grown without organic manures to fertilize them.

Emphasis on Inorganic Fertility

Our understanding of plant nutrition began naturally with attention to the inorganic or the

mineral part of the soil. Soils originate from the rock minerals. The science of chemistry required for this understanding began also as knowledge of the inorganic, or mineral, elements. In trying to learn what the soil feeds the plant, naturally we made a list of the inorganic elements found in the plants after "ashing" or burning them. Inventories of the inorganic elements in the plants were matched against inventories of the soil's similar contents. Such knowledge built up the inorganic concept. It is serving well for our testing of the soil's supplies against the growing plant's contents of thirteen or more known essential inorganic elements moving into the crop from the soil. By the help of such tests we make our decision on buying chemical fertilizers as supplements to the incomplete plant (and animal) nutrition which the fertility supply of the soil represents.

Success to date in improving the yields of our crops by means of commercial fertilizers has naturally emphasized the crop's inorganic nutrients from the soil. Unfortunately, such success has made us prone to discredit the value of farm manure. It has encouraged us to believe that barnyard manure is worth no more than the total of nitrogen and inorganic elements it contains. Yet pure water, given the chemical equivalents of the manure's ash components for the growth of plants as hydroponics or water culture, is not the equivalent of their growing in the rotted manure. Our botanists have demostrated plant growth regularly by using water cultures containing only the elemental inorganic substances of the plant's composition. For teaching purposes, the chemists also start with inorganic elements. Beginning chemistry deals mainly with rapid chemical reactions. These lend themselves to speedy demonstrations because things happen quickly.

Organic processes in general, and most biochemical reactions, however, are not such speedy performances. Even some inorganic reactions, particularly those including the element silicon, making up such large molecules as the clay, are slow and sluggish. The evaluation of chemistry started with the simple, active, dead, incombustible, inorganic elements of the smaller molecules. It has now arrived at the complex, less active, living, combustible, organic molecules of enormous size. Only lately have we become able to build up organic compounds like the synthetic fibers, rayon, Vicara, Orlon and others of industrial output to substitute for those naturally created.

When organic compounds came into chemical thinking so late, it is not surprising that organic

compounds in resurrection from the soil should not yet be widely envisioned or recognized as nutritional contributions to plant creation. We have been content with what understanding we had of the inorganic elements as they are contributed by the soil for crop production. We have been content with increased crop yields resulting from inorganic fertilizers. Possible research ahead, even in that phase of plant nutrition via the inorganic part of the soil, is still so extensive that almost no Experiment Station has taken to testing the hypothesis that complex organic compounds might be fertilizers. We have not yet believed that soil organic substances might be highly contributory to better feed and food quality even if they are not contributing to more tons and bushels.

Because plants will grow when fed on strictly inorganic elements in water, that fact is no refutation of the possibility that such a seemingly good diet for plants might not be a better one if supplemented by some organic compounds. The limitations of hydroponics indicate how far this plant growth procedure differs from that of plants growing in the soil. In the first place, the solutions for hydroponics must be extremely dilute. In the second place, they must be changed and renewed often. Only so little of each element dare be present that it will not combine with another element to make both become inactive. Consequently one can't put enough nutrient elements within root-reach to carry the plant to maturity except with frequent renewals of the solution. Limitations to this degree are not the situation in the soil. The elements used there are even present in combined or less soluble forms and yet in ample supply to nourish the crop throughout the growing season.

Hydroponics may g r o w the plant, but this is not a process necessarily duplicating those activities growing the plants in the soil, even so far as inorganic nutrients are concerned. Consequently the fact that plants can be grown, and reasonably good yields obtained on wholly inorganic materials, does not deny the possibility that plants growing by different dynamics within the soil may not take from there some organic compounds serving in plant nutrition. Such refutation of the organic possibility is no more logical than to say that because man can live on bread he cannot live on meat, and even live better.

Organic Matter Grows Antibiotics

The pioneer f a r m e r looked much to the organic matter of the soil for the secret of its power to produce the crops for feeding his young animals. Commercial fertilizer sales in early times in

the south met with resistance in the farmers' contention that bird guano from South America helped his crops more than they were helped by Chili Saltpeter from there. The pioneer was clinging to organics for his choice way of fertilizing his cotton and other crops. Was he possibly recognizing benefits from organic compounds coming with those manures in addition to benefits from their salt contents?

Now that we find the antibiotics—those complicated chemical structures, made from organic matter in the soil by microbes—doing such wonders for us when put into our blood stream, perhaps we can visualize possibilities of good from organic substances coming out of the soil, coursing up through the roots and going into the plants for growth benefits to those life forms. When water extracts of the organic matter in soils serve as growth hormones in the laboratory for test plants, and when hogs have long "had the habit" of rooting and have been growing more rapidly under experiment if fed some sod soil or antibiotics, isn't it time that we open our minds to the possibility that organic compound as well as inorganic ones may be coming from the soil for better plant and animal nutrition and for better reproduction of their respective kind?

Mushrooms are a food crop that grows by feeding wholly on organic matter. They grow in the dark. They do not use energy directly from the sunlight. For that they must absorb organic compounds and burn them, or respire them, for energy for growth. They are a crop (but not plants) which is creating a living organic matter by using dead and decaying ones.

That plant roots take up organic compounds for their nutrition and growth was clearly demonstrated by Prof. W. J. Robbins when he grew excised roots in the dark to fill flask after flask of them. All the inorganic essentials in various combinations failed to keep the roots multiplying. It was only when ordinary sugar and vitamins—complex organic compounds—were added to the sterile medium that the roots grew most rapidly. Sugar without the vitamins was insufficient. Here again there was plant (root) growth, but not unless the necessary organic compounds supplemented all those inorganic ones which we commonly list as required for plant growth. When the pioneer said "I prefer guano or manure" perhaps he was recognizing the effects by organic matter taken up by the plants even if he did not know of the chemical details involved.

Hogs Find Organic Compounds

Some field tests of different soil treatments under corn using

the preferences shown by hogs for the different grains according to the soils growing them, suggest that the differences in the feeding quality of the corn grain reflect different organic compounds in it coming from the organic matter in the soil. Corn was grown on three plots given (a) limestone, (b) limestone and phosphorus, and (c) limestone, phosphorus and potassium. Each had sweet clover as green manure plowed under ahead of the corn. It was grown also on three additional plots given exactly the same inorganic fertilizer treatments, but the sweet clover following the wheat crop was allowed to occupy the plot for the year to make sweet clover seed and to leave the dead residues to be plowed under in the fall ahead of the following corn crop. Just as one would expect, these duplicate sets of inorganic soil treatments grew more sweet clover and more corn as more of the commercial fertilizers was used.

One hundred pounds of grain from each of the plots were put into the separate compartments of a self-feeder for the hogs. When one compartment was about emptied first by their choice of it, the corn remaining in each compartment was weighed and thereby the percentage consumption determined as the index of the hog's choice. This was then repeated — with the position of the corn for each soil treatment in the self-feeder changed—only to find that the hogs' selection of the grain duplicated their previous choice according to soil treatments, irrespective of the grain's position in the self-feeder.

That the hogs discriminated by choice of the grain according to the corn plants' use of organic matter in the sweet clover either turned under as a green manure or left dead as crop residues rather than according to the corn crop's response to the inorganic fertilizers was the surprising feature clearly shown. The hogs consumed 100, 80, and 65 per cent for the inorganic treatments (a), (b) and (c), respectively, where sweet clover was used as a green manure ahead of the corn. They consumed 62, 85, and 100 per cent for the inorganic fertilizers (a), (b) and (c), respectively, where dead sweet clover residues were plowed under ahead of the corn planting.

In the first set of figures where the sweet clover went under green, they voted against more inorganic fertilizers for getting bigger crop yields by this soil treatment. In the second set of figures, where residues of the matured sweet clover crop went under, they voted in favor of more inorganic fertilizers for the corn. Here they voted also for bigger yields of sweet clover resi-

dues plowed under, and for larger yields of corn accordingly.

The discriminating hogs suggested that they were choosing the grain according to differences in its content of some organic compound because of differences in organic matter in the soil no greater than those from sweet clover as green manure going into the soil to feed the soil microbes in contrast to sweet clover residues left after the seed was harvested. Apparently after more hogs will suggest to us that different kinds of organic matter in the soil make differences in the feed values of the crops growing on it, perhaps more of us will consider the possibility that organic compounds enter more directly into plant nutrition.

Organic Compounds in Cycles

Some research by Dr. Francis M. Pottenger, jr., of Monrovia, California, points out that small differences in the way the feed was handled for the animal making manure from it are reflected as differences in the characters of growth by the plants and their seeds on soil fertilized with the manure. Some drawf bean plants were grown on the sand of the pens into which cats had buried their dung for the two preceeding years of some nutrition experiments. The male cats were kept in one set of pens. The female cats were in a corresponding set. The pens included cats fed alike in all respects except the milks. These included the following: (a) condensed, (b) evaporated, (c) pasteurized, and (d) raw milk.

After the nutritional studies with cats were terminated, the neglected pens were observed to be taken over by a volunteer weed but of widely different sizes of the crop in the different pens according to the different kinds of milk fed the cats. Here was a natural demonstration in plant nutrition according to soils fertilized with a single organic matter but one differing in limited details. It was an opportunity for an experiment. As a consequence, the weeds were removed and the pens planted to the ordinary white bean, the pedigree of which listed it as of the "dwarf" growth habits.

It was most surprising to note that in all six pens in which the buried dung was from cats fed the heated milks, namely condensed, evaporated and pasteurized, the bean plants had grown as "dwarf" plants. But in the two pens in which the buried dung was from cats fed raw milk, the bean plants were growing, not as "dwarf" plants, but as "pole" beans with their vines going to the top of the screened sides of the pens.

Not only was the growth habit of this legume plant changed, but the differences in the harvested

seeds suggested that the organic chemical compounds giving the unpleasant stench to the cat dung, namely indole and skatole, were carried without change from the buried dung through the plant and into the seed. This was true in the cases of the heated milks. But these same compounds were not detectable by the nose for the bean seeds grown in connection with the feeding of the raw milk. There was the suggestion in the latter case that the stench-delivering compounds were synthesized by the soil microbes or by the plants into indole-acetic acid. This is not characterized by the stench but is the common plant hormone which applied as a drug would change the growth characters from the "dwarf" type to the "pole" bean type.

Indole and skalote are the end products in the digestion by the animal and human of the amino acid, or protein constituent, known as tryptophane. They are excreted in the feces and the urine. The uptake of indole, for example, by the plants and its deposition in the high-protein seed of these plants suggests that they may use this complicated ring structure in this organic substance as the starting compound from which to make tryptophane. Heated milks as cat feed suggest that something was missing in their dung-fertilized soil for this synthesis. Raw milks suggest synthesis of these starting compounds into the indole-acetic acid hormone, at least, for plant growth stimulation, if not possibly even into tryptophane for the more complete proteins. No tests for tryptophane were made of the respective bean seeds. This hypothesis calls for additional research, not anticipated at the time of the experiment.

Here is a suggestion that organic compounds as well as the inorganic elements may be travelling in cycles from the soil into the plant for their build-up into more complexity there, into the animal for partial digestive simplification there, and then through the excretions back to the soil for another cycle of nutritional service. Such cycles of parts would scarcely be expected as necessary while the plants are elaborating carbohydrates, but might well be anticipated as essential for the plants' synthesis of proteins.

It is particularly significant that the illustration cited relates to the amino acid tryptophane, which is the major part deficient in the protein of the corn grain and is the protein shortage for the correction of which protein supplements must be so generally purchased and imported rather than be grown along with the corn. It is still more significant, when the increased concentration

grown on the level prairie soils of Missouri resulted from some experimental treatments of them with the trace elements.

Challenge for Future Research

When the effects from fertilizers on soils are measured by no more searching criteria than yield variations in vegetative bulk, recorded as tons and bushels, there is little chance that we shall recognize crop differences demonstrating the differentiating effects between the uses of inorganic and organic fertilizers. But when our animals are telling us that the crop's nutritional quality reflects the different organic compounds feeding the plants; and when we learn to measure the crops' responses to soil fertility by more than bulk values and ash differences; perhaps the different contributions by the soil to plant nutrition will compel us to catalogue among them the organic compounds as well as the possibly incomplete list of inorganic elements. Then also when nutrition moves forward into its fullest meaning to put emphasis on more than calories from carbohydrates, fats, etc.; and when it includes proteins more completely considered than those measured by total nitrogen multiplied by some mathematical factor of common agreement; perhaps, then, our research imagination will envision the possible creative roles of organic matter in crop production as something more than mere myth or fiction. Let us hope that the minds of more leaders in the Experiment Stations will be open for research projects looking toward fuller knowledge of better nutritional quality in what we feed our microbes, our plants, our animals and ourselves because organic matter serves as fertilizer in that ministration.

Rubber Gloves — It is a wise farmer who invests in and uses a pair of rubber gloves while handling newly born baby pigs and calves. Many of the cases of undulant fever among farm and ranch folk can be traced to an infection incurred by handling young pigs or calves which may come from mothers infected with brucellosis. Furthermore, it is much safer to call your veterinarian to treat a cow which has not cleaned properly after calving, rather than for a farmer to attempt to perform this work himself. In such situations brucellosis germs are quite frequently present and can infect the farmer who is not properly protected, or aware of the potential danger.

Spring Visitors Bring Fall Sales

Two Brothers Open Their Orchard at Blossom Time

By Charles L. Stratton

PRACTICALLY three out of four cars traveling the macadam that day turned off abruptly beside the big maple and disappeared along a dusty road leading into a fragrant orchard. This was all part of the Marshall farm sales strategy.

The motorists, mostly city folks, were out to enjoy the apple blossoms. The Marshall brothers figure a lot of them come back in the fall to buy apples.

Alfred and George Marshall in Worcester County, Massachusetts, turn their orchards over to the public during apple blossom time every year. Signs all the way out from the city point the way over several miles of scenic countryside to this apple growing center. A big white sign with black lettering is tacked up for all to read: "Visitors Welcome, Follow the Arrows."

The cars pouring into the 34 acre orchard follow a wide, circular figure 8 that winds through the orchard and returns, a route of about a mile in length. There is no danger of blocked traffic or lost visitors, as there are directional arrows along the route.

Many of the visitors spend the day in the orchard taking pictures and eating lunch under the trees. A few pick bouquets to take home. But these are in the minority.

To the Marshall brothers, it is good business. In the fall, when thoughts turn to apples, these visitors drive out over the week ends and pick up their own fruit at the packing house. A little advertising pays off in a lot of sales. *Pennsylvania Farmer*

How to Count Your Rats From an Easy Chair — "If you never see any live rats, but find their droppings or tracks and see some signs of rat damage, you have all the way from one pair to 100 rats on your farm. If you see a few at night, there are from 100 to 500 around, but if you see them every night, and sometimes in the daytime, man, you've got a menagerie—from 500 to 1,000 live with you," says Dr. Gunderson of Iowa State college.

It costs $2 a year to board a rat! He consumes about 40 pounds of feed per year, not to mention what he wastes and contaminates. The 50 offspring of one pair of rats can eat a ton of feed.
a national farm problem.

Cut Chore Time

Dairymen Try Once-a-Day Feeding

Omar Shonkwiler

Condensed From The Farmer

"I CAN'T see any production loss."

"I've had less trouble with damaged teats and udders."

"Cows seem more contented."

These comments on once-a-day feeding of dairy cattle come from dairymen in Steele County, Minnesota. Visiting with them, you get the idea that once-a-day feeding can cut labor for the man with a stanchion barn as loose housing has cut labor for many other dairymen. And on-the-farm experience with once-a-day feeding didn't result in decreased production as at least one controlled experiment had indicated. Production in the herds of farmers with whom we talked had increased on once-a-day feeding.

Of course, handling dairy feed only once a day saves labor. But how much? Lloyd Zolnowsky, one of the first Steele County dairymen to adopt the practice, says actual feeding time saved amounts to one hour a day. He points out that it gets dairy chores done in fewer trips to the barn. That means more time for other work, or just for doing nothing.

Here's how Zolnowsky operates. After the morning milking, he gives his Holsteins a full day's feeding of grain, fed according to production. Some cows get as much as 18 to 20 pounds of ground corn-oats mixture, and two pounds of high-protein soybean oil meal.

After breakfast, Zolnowsky supplies each cow with 35 to 40 pounds of corn silage, and cleans the barn. When he's in the barn for the evening milking, he feeds enough hay to last the cows until next morning. The cows eat an average of 20 pounds per head per day of chopped alfalfa-brome hay.

The once-a-day feeding program gets Zolnowsky out of the dairy barn from about 11 o'clock in the morning until late afternoon. With the system, he's handled a 23-cow milking herd with only part-time help during haying and harvest. He farms 155 acres.

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St. Paul, Minnesota, March 22, 1952

On the production line, Zolnowsky's Holsteins have done all right on once-a-day feeding. The herd was averaging 350 pounds of butterfat per year when he stopped feeding twice a day in December five years ago. Now they run 440 to 450 pounds of fat a year. He doesn't claim once-a-day feeding caused the increase, but certainly the herd average continued to climb with this system of feeding.

Zolnowsky turned to once-a-day feeding one December when he was short of help. Now his cows are fed once a day as soon as he opens the silo every fall. Replacement heifers for the herd are also fed once a day.

It's no accident that many young Steele County farmers have turned to once - a - day feeding. They heard about it from Anton Resler, a dairyman and veterans' agriculture instructor who practiced what he preached. For three years Resler taught veterans' agriculture classes at Owatonna. He talked once - a - day feeding with authority. His 18 grade Holsteins topped a Steele County DHIA for 1950 with a hard average of 509 pounds of butterfat average that herd had ever made.

Arnold Hanson was one of the students in Resler's agriculture classes. He now feeds his dairy herd only once a day during the winter. Hanson's herd of young Guernseys gets silage and grain after the morning milking. He cleans the barn while the cows are eating silage, then feeds a one-day supply of baled alfalfa and clover hay. His cleaning and feeding chores are finished by 11 o'clock.

This is the third winter Hanson has fed only once a day. His herd has gained an average of 20 pounds of butterfat per cow in the last three years. Well-managed young cows could be expected to gain in production. But once-a-day feeding hasn't interrupted the gain in Hanson's herd.

Like Saving of Labor

Whether to feed a day's supply of hay in the morning or in the evening seems to be a matter of the dairyman's choice. George Tuttle's herd of grade Jerseys and Guernseys roll along on a yearly average of 413 pounds of butterfat. He's fed them only once a day for the last two winters—grain and silage in the morning, hay in the evening. The herd average has increased both years, but Tuttle and the other Steele County "pioneers" stress the labor-saving features of once-a-day feeding. Too many other things can change production.

After the morning milking, Tuttle sweeps the mangers and feeds hay and silage. He feeds the day's supply of hay at about 4:30 in the afternoon. Tuttle says his herd is more contented

on the once-a-day program. The same cows eat no more total feed than they did when fed twice a day, and don't seem to "go off feed" as often.

Once-a-day feeding seems to be a good safe labor-saver for stanchion barns. Labor was cut 24 minutes out of every hour in the USDA experiment at the Mandan, North Dakota, dairy station. In this experiment hay consumption was cut nine per cent. Milk production was off five per cent. The Steele County dairymen agree that once-a-day feeding takes about 40 per cent less labor. On the production end, most of them have had increase enough so that they wouldn't go back to feeding twice a day on the chance they might have missed five per cent.

All of the Steele County dairymen fed corn silage and hay as roughage. What if you're using grass silage? H. R. Searles, Minnesota Extension dairyman, says cows should eat it as well fed once a day as they would on a twice-a-day schedule.

There are these words of caution. For one thing, be sure the manger space in your barn will hold enough hay or grass silage to last the cows from one feeding to the next. Some stanchion barns lack this space. But feeding grain and corn silage only once a day would still save some mid-morning and mid-afternoon trips to the barn.

And, you probably shouldn't switch a high-producing herd in the middle of the winter. The logical time to start the once-a-day feeding program is when the herd moves inside for the winter and the silo is opened.

THE OLD DUFFER'S ALMANAC

Bulletin From the OPSNPAOCDCMPETC — Our experts consider that effects of the situation at home and abroad may be far reaching—how far they cannot say. It is possible that we may or may not have inflation, in which case we should be prepared. Patriotic citizens are urged to pay no more than they have to for anything. Citizens are urged to have a feather bed handy at all times in case of bombing. Be calm; remember that we are the strongest nation in the world but weak at present. Ways *must* be found to enlist more government employees in order to preserve their way of life. Above all, never fear. Your experts are way behind you.

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Lewis-Shepard Products, Inc., Watertown, Mass.

That Water Is Ruining My Land and Yours, Too

A Story By Angus McDonald

OLD MAN CASSIDY had 10 acres adjoining the north field, and they were being washed all to pieces. The land was originally pretty good, particularly the lower end. But every year our land got better and his got worse. Anybody could see that.

One day the old man walked Cassidy all over our farm and showed him his dams and his rock walls and his good crops. When they got to the lower side of the north field the old man stopped and pointed up the hill.

He looked at the long slopes that ran together and formed a draw in between. About 30 feet apart all the way up the draw were rock dams, and on the lower side was a rock wall three feet or so wide clear across the field. You could see the land rising all the way up the draw because the dirt had filled in behind each dam until it was six inches to a foot higher than the land behind it. The rows ran on the contours of the hill, and the pea vines were a dark green. In front of the rock wall the wash had filled in until our land was a foot and a half higher than old man Cassidy's.

"Look at that land," said the old man. "Four years ago you said it wasn't worth cultivating. I got a good crop of oats off it and the peas will be ready to pick in a few weeks. We'll pick what we need and then we'll make hay of the vines. I may not need all the vines. I'll turn the hogs and stock in on what we don't need."

The old man always kept plenty of cowpea seed for his own use and some to sell. He sold 30 or 40 bushels a year to the neighbors at five dollars a bushel. Nobody else picked and threshed his peas. It was too much trouble. The old man always had plenty of pea hay. He said that it was especially fine for milk cows in the winter. He kept all his hay in the dry. Not a drop of water ever fell on it if he could help it. Sometimes when a shower came up all hands and the cook turned out and got the hay under shelter. Then if it wasn't cured enough, we'd have to scatter it around the place. Although he sometimes put his hay in the barn before it was entirely cured, it never molded. He had

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a system of ventilation in the barn. There were poles run through at intervals and parallel to each other. The hay was thrown over the poles so that there were air holes underneath.

Cassidy looked up the long hill at the draw with the dams and then he turned and looked at his field. "Brother Mac, you are the damnedest dam-builder in the whole damn country. But I ain't got time to be hauling so much rock. You see that gully? Why, it would take a thousand loads of rock to fill it. I ain't stout. I can't be lifting them big rocks anyway."

"It wouldn't take a thousand loads of rocks," said the old man. "Let's see. I'd put about eight dams in that biggest gully. Of course, with the gully that deep it would take about a wagonload to each dam. I'll tell you what I'll do. If you'll put in those dams I'll furnish you a hand to help you lift the big rocks."

I could see the old man was getting enthusiastic. He hated gullies worse than he hated the Devil, and he had looked at Cassidy's biggest gully for a long time, watching it grow and eat out and undermine the land. "Then you could put a ditch here by the fence to take care of the surplus water. You could build little dams in the small gullies and you could run your rows on the contour of the hill to take care of the sheet wash. You shouldn't ever put cotton on that land. It is too hard on it. Cotton has been the ruination of the South. The American farmer is digging his economic grave by wasting his land."

The old man went on for some time like this, but I could see old man Cassidy wasn't much interested. "Brother Mac," he said, and he wiped the amber off his lip, "your idees are good, but not for the likes of me. I couldn't do all that extry work. I am rather poorly with my asthmy, and I have to raise cotton. How would I get money at the bank if I didn't? I got to have money to raise a crop and live on till I sell my cotton. You are well fixed. You can make all these improvements, but I ain't got the money."

"Well, why don't you run your rows with the lay of the land and not up and down the hill?" asked the old man.

"I don't like point rows. I can't be turning my cultivator around every 20 feet. Why, if you was to run rows across the hill here you wouldn't get no work done at all —you would be turning round all the time."

"Well," said the old man, getting a little vexed, "you could build those dams. I told you I'd furnish you a hand to help you."

"Brother Mac," said Cassidy, "that-air water has got to go somewhere. Why not in that

gully?"

The old man snorted. As he turned and stamped off toward the house I heard him mutter, "Stupid fool!"

In his walks over the farm the old man got so he'd stop and look at the Cassidy 10 acres more and more. Every time he looked at that big gully he seemed to get angry. It *was* a big gully. It just seemed to spring up out of the ground from nowhere right below our land. It ran about 25 yards from the fence almost straight down through Cassidy's land. The strip east of the gully was full of blackberry bushes and sassafras sprouts. We used to go down every year and pick blackberries in that thicket. In some places the underbrush was so heavy you couldn't ride a horse through it. This big gully ran on down the field, and where the land flattened out it got shallower, and you could see the sand that had been washed down on the good land in the lower end of the 10 acres.

This end was flat and poorly drained and had a lot of swamp grass in it. In a wet year any crop that was planted there drowned out.

West of the gully old man Cassidy cultivated in cotton every year. The cotton never was much account, though. He never made over a bale and a half on the whole field.

Cassidy never broke his land. In May he would take his lister and throw up ridges, using last year's cotton rows for a furrow. He dragged the ridges down and then planted the cotton. The part of the field between the gully and the fence he let lie out.

More and more the old man walked down to the lower side of the eight-acre piece and looked at Cassidy's land. One day he climbed over the f e n c e and walked up and down between the stunted rows of cotton, talking to himself. I heard him mutter something about the foundation of civilization's being undermined. Then he turned to me.

"Son," he said, "we'll buy this land. We need more land anyway."

"But this land is poor and thin," I said. "Besides, old man Cassidy is so contrary he probably won't sell it."

"He'll sell," said the old man, and his lips set in a firm line and the muscles in his jaws showed the way they did when he gritted his teeth. I knew then he would have that land, because when once he made up his mind about something he never changed it.

The next day Cassidy came over to borrow a hamestring. The old man always kept a supply on hand. He and Cassidy got to talking about the land and crops. "My land ain't good like yours, Brother Mac. It washes so bad.

And my crops is poor. That last big rain washed out a lot of cotton on the north side of my field."

"You're right," said the old man. "Your land is awful sorry. Some of it is not worth the taxes on it. It'd pay you to let that north 10 go back for taxes."

"Oh, I wouldn't do that," said old man Cassidy. "I wouldn't let it go for taxes. I might sell it, though."

The old man laughed. "Who'd buy it?"

"Why don't you buy it, Brother Mac? You said the other day you needed more land."

"I need some good land. Well, we've got to get back to the field and finish pulling fodder. My daddy always saved his fodder. A good bundle of fodder will keep a horse from getting the thumps in hot weather."

The old man never let his horses have much green stuff when they were plowing, especially in corn that was waist high or over. He plowed his corn a month after the neighbors had. I've seen them lay their corn by when it was hip high with straight shovels or solid sweeps. "Corn," he would say, "has an extensive root system. It has to have lots of moisture. Look at the plow of a farmer who socks his plow into the beam next to the corn. You'll see thousands of roots hanging on the plow. The farmer who does that will lose his corn in a drouth."

The neighbors couldn't understand why the old man's corn stood the drouth. Theirs would twist and burn, and the hill farmer was lucky if he got even a few nubbins. But the old man always made corn, drouth or no drouth.

In the first place, he turned his land deep so it would hold the moisture longer. Then he prepared a fine bed, and after the corn was up he plowed it every eight days. The other farmers waited for a rain before they plowed, but not the old man. He was a fanatic on raising corn. When it got up about knee high he quit using shovels and started in with solid sweeps, and later with open sweeps, and later with big buzzard sweeps that barely scratched the surface. He had a theory about holding the moisture in time of drouth that took him an hour to explain. But nobody listened. The other farmers went on plowing their corn in the same old way. We didn't listen to him either. What was the use, when we had heard it so many times?

The old man said that if you kept the surface of the ground stirred it would break the capillary continuity and hold the moisture. He kept doing this in time of drouth until the corn was in silk and tassel.

One reason the old man's ideas didn't go over so well was that

it took so much work to put them in practice. The neighbors thought it was foolish to pull fodder. It was a lot of trouble. We had to pull it in the hottest weather and tie it in hands, and then about dusk when the dew had begun to fall, go out and tie four hands into one bundle. If you tried it before dusk the blades were so brittle that they would tear all to pieces.

"Brother Mac, you shore do like work," said Cassidy. "Why, you can get hay a lot easier than that."

"Cassidy, I heard you had been buying some hay," said the old man. "I have never bought a bale of hay and I never expect to."

"Seems like my medder didn't turn out so good on account of the drouth," said old man Cassidy. "Brother Mac, if you hear of anybody that wants to buy my land, let me know. I'd sell cheap."

"Any price would be high for that land," said the old man. "Come, boys, it's burning daylight; we've got to get that fodder pulled before night."

Cassidy came back a few days later to borrow another hamestring. I wondered why the old man didn't ask him about the other one he had borrowed. But he didn't mention it and seemed glad to lend him another one. He and Cassidy got to talking. I though maybe the old man would mention the 10 acres, but he didn't.

Cassidy hung around quite a while. As he was leaving he said, "You know, Brother Mac, I was looking over that 10 acres this morning and it's a lot better than I thought it was. Part of it, if it was cleaned up, would be good land."

"Why don't you clean it up?" said the old man.

"Brother Mac, why don't you buy that land? You need it to fill out your farm."

"No, I don't need it."

"Brother Mac, what will you give me for the 10 acres?"

"Well, I don't need it, but just to help you, I might take it off your hands. I tell you what I'll do. I'll pay the back taxes on it and pay for the deed and abstract."

Old man Cassidy was an easy-going old fellow who hardly ever got riled up, but I could see this made him angry. "You are a preacher and you are trying to rob me."

"Why, Cassidy, you know that land isn't any good. I just want to help you out."

"You want to help me out, all right—help me into the poorhouse. Now, Brother Mac, why don't you make me an offer?"

"I never like to price another man's stuff. If you want to sell it, put a price on it."

"I'll take five hundred dollars,"

said Cassidy.

"You misunderstood me. I didn't want a price on your whole farm."

"Well, I'll take four hundred dollars for the 10 acres, and you pay the back taxes."

"Cassidy, this heat must have affected your mind. That's not bottom land."

"With a little improvement," said Cassidy, "it would be fine land. There is a fine spring on the lower side. Don't forget that."

"You mean that hog wallow? That's not a spring. I'll tell you, Cassidy, the best I'll do. I won't go a cent higher. I'll give you fifty dollars and pay the taxes."

"Now, Brother Mac, you and me has always been good friends. You want me to give my land away. That land is worth three hundred dollars if it's worth a penny, and I'll not take a cent less."

"We have been neighbors a long time and I shouldn't let my friendship for you sway my business judgment, but I am going to offer you, against my better judgment, a hundred dollars. That's absolutely the best I'll do. Well, boys, we've got to get back to the field."

Cassidy went on home grumbling to himself, and the old man was in an unusually good humor for several days. He went down and looked over the 10 acres again when he was sure Cassidy had gone to town.

A week passed, and the old man seemed to get worried. He looked down toward Cassidy's place several times a day and frowned. Then one day something got the matter with the mowing machine and he sent me over to Cassidy's to get him to come and help fix it.

"Old man Cassidy doesn't know anything about a mower," I said.

"You never mind. Do what I tell you," said the old man sharply.

When Cassidy got there, he looked the mower over and began telling how much he knew about machinery. "Yes, I know you are a natural mechanic," said the old man. "This blade seems to be stuck some way and won't work back and forth as it should."

Cassidy didn't know anything about machinery, but he thought he knew everything. He and the old man triggered around the machine, worked the blade back and forth, and rolled the wheels a few times and the blade started working as it should.

"I thought you could fix it," said the old man.

"Never did see anything I couldn't fix."

"How about a cold glass of buttermilk?"

"I reckon I never did get enough of your good woman's buttermilk. I was just telling the woman the other day, Mis' Mac

makes the best buttermilk of any woman in the country."

"Sonny," said the old man, "you go get us some of your mother's good cold buttermilk. We'll lay off this afternoon. It's too hot to work." I shall always remember that day because it was the only time in the 10 years we lived on the farm that it got too hot to work.

That night at supper the old man was beaming. "Well, boys, I just bought the Cassidy ten."

The old man was a hard worker, but I have never seen him work so hard as he did that year on the Cassidy land. It was August when he bought it, and we hoped that he would wait until the worst hot weather was over before he started to work on it.

The old man began on the thickets along the gully. He hired two extra hands and set them to cleaning the place up. He had all the blackberry bushes and second-growth stuff cut out. He had one hand dig a ditch along by the fence down the hill and he and two others, after the brush was cleared out, did the hauling. Of course, my brother and I worked, too.

When the brush was cut we piled it in the deepest part of the gully. Then we built eight big dams about 25 yards apart. I have never seen the old man take such pains. For the major wall he got the biggest rocks he could find and placed them all carefully. Sometimes he would show his hands how to build a dam and go round to superintend the other work. When he returned he would look at the dam, find something wrong with it, and tear it out and build it himself. He carried a sledgehammer in the wagon to break the rocks so they would all fit into place. The approaches extended back 20 feet from the major wall. Some of them had 10 or 15 loads of rock in them. When he had finally completed a dam and had got it just as he wanted it he would "hist" his foot on the wagon hub and give a lecture on the soil.

"The Scotch," he said, "have contributed a great deal to conservation of the soil. There is no doubt in my mind that Jefferson got a lot of his ideas from them. It is natural, of course, that the Scotch should have been conservationists since they had a very poor country and since they were foremost in everything else."

The hands didn't pay any attention to his lectures, but they enjoyed the rest anyway. Although the old man was getting along toward 70 at the time, he could work down any hand I ever saw. After four or five days the new hands quit. They couldn't stand the work. Even Charley threatened to take out. He said he wasn't going to kill himself for no dollar a day.

After the big dams were made the old man built a lot of little ones in the smaller gullies. He got some new hands and they finished digging the ditch which ran along the fence through the 10 acres and divided it in half. Three acres of the 10 were pretty good land and the old man planned to raise corn there. He built another fence, dividing the east five acres.

In the spring we got Uncle Josh Choate to help us set out Bermuda grass in the remaining two acres, and the old man built a gate between this field and our own grass pasture. The year before we had set out Bermuda in the calf pasture and the upper two acre piece north of the garden. We took an old axe and chopped the Bermuda into blocks about four inches square, then slipped a straight spade under them to break loose the bottom rocks. Then we threw them onto the wagon.

The old man prepared his ground very carefully for Bermuda. He turned the ground and harrowed it three or four times so it would be finely pulverized. Then he laid off rows with a Georgia stock and a bull-tongue. We walked along behind the plow, dropping the seeds and mashing them down with out feet.

Uncle Josh was the slowest worker I ever saw. When he came dragging out to the field

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with the sun two hours high the old man would say, "Look at Uncle Josh. Sight behind this post to see if he's moving."

Uncle Josh thought p e o p l e were all wrong for working so hard. "I would rather sit in the shade and eat strawberries."

The white man, as Uncle Josh figured, had ruined a fine country. "Work, work, work. I'm sick and tired of hearing about work. When I work I take my time, but when Brother Mac works he tries to kill himself.

"Boys," he said, "the Indians had the best way of life. They really enjoyed life. They hunted and they fished, and they didn't wear themselves out working for ungrateful children. I'm glad I haven't got any children to worry me to death. That's all children do—worry their parents. I believe in taking my time about everything. I don't even go to the privy as often as other people. One time I didn't have an action for nine days—yes, sir, nine days."

"How did you feel, Uncle Josh?" I asked.

"Felt fine, felt fine. But you can't tell some people anything. Brother Mac is working himself into an early grave. What's the use? Rome wasn't built in a day."

Uncle Josh spat slowly and wiped his lip with his hand. Then he got a sod out of the wagon and squatted down in the furrow and p r e s s e d the damp earth

around it. "Now this grass will do better than just stepping on it." He packed the dirt around the sod like it was a sweet potato plant.

"Yes sir, I told Charity, I said, 'It's not everybody could go nine days without an action. That would kill an ordinary man.' Felt fine. In fact, I don't recall that I ever felt better."

Uncle Josh was long and stringy and it took him quite a while to unfold himself and go over to the wagon and get another sod.

"You boys," said Uncle Josh, "have to work too hard. Why, when I was a boy all I had to do was to hunt and fish. These hills were full of deer and wild turkeys, all kinds of game. Yes, the good old days are gone."

"Uncle Josh," said the old man, who had walked over to where we were, "if you'd work more and talk less you might get more Bermuda set out. I've set three rows to your one."

"Rome wasn't built in a day," was all Uncle Josh said, but he didn't have much to say the rest of the day.

After we got the Bermuda set, the old man had a lane built down to the spring between the two fields. He made his fences out of good, stout hog wire and three or four barbed wires. There was an old hog wallow down at the lower end of the field where water stayed most of the year. The old man cleared this hole, dug down about six feet, and walled it up. Then he enclosed about a fourth of an acre that he called the playground and put a big trough by the spring and ran a spout from it through the fence. In that way he kept plenty of water for the stock at all times. I used to go down about daylight every morning and fill the trough.

Ben Trimble lived right across the road from the spring and he could holler louder than any man I ever heard. Ben was a good worker and a good man, the old man said, but he could cuss louder and longer than any man in the country.

"Pity about Ben being so wicked," said the old man. But I noticed he liked him fine anyway—a lot better than a lot of people who went to church and were so lazy they let their families starve.

"Ben is a good provider," said the old man. "A man who won't work, who'll lie around and let his family go hungry, ought to be taken to the woods and be bucked down over a log, have his pants lowered and a big board applied to his setter. Lots more people will go to hell for not working during the week than for cussing or working on Sunday."

There were several gullies that ran down through the good land that the old man wanted to put

corn in. He built several dams to stop the wash and dug a ditch alongside the fence where part of the gully ran. The water came from old man Cassidy's land on the east side. Just before it got to our land it spread out over the field and ran through the fence and onto our land. Part of the land was washed clear down to the subsoil, leaving the surface hard and slick.

"I'll get Cassidy to build a dam along the dividing fence and turn the water into the ditch so it'll stop that water," said the old man.

The next time Cassidy came over to borrow something the old man took him down to the field and explained his plan.

"Brother Mac, that-air water has got to go somewhere."

"But that water is ruining my land and yours, too."

"Well, I ain't going to build no dam for you," said Cassidy. "You build all the dams you want to. Dams is all you think about. You got the dam fever. But I'll be damned if I build any damn dams on this damn land."

The old man's face got grim. His steel-gray eyes got small and sort of three-cornered. He gritted his teeth and I could see the muscles standing out like cords on his jaws.

"Very well," he said, "you ignorant, illiterate, churn-headed fool! But it's you and farmers like you that are ruining this country. Yes, ruining it—world without end. This country is going to rack and ruin because of improvident farmers. What you need is to be taken out and bucked down over a log. Now you get off my place and stay off."

The old man didn't speak to Cassidy for five years. Not long after that Cassidy went around to Uncle Green and talked to him about making up with the old man.

Uncle Green said, "Well, Jim, you've got to make allowance for some people." But it didn't do any good.

"I'll have nothing more to do with that churn-headed fool," said the old man.

New Farm Conveyor Moves Grain and Feed Through 1 and 1½-Inch Pipe — With help of a 3 to 5 h.p. air compressor, agricultural engineers at West Virginia Experiment Station have moved 1,200 to 1,500 pounds of grain per hour through common pipe. A 1-inch unit carried grain 50 to 75 feet using not more than three pounds pressure. Further tests are being made. Potential uses are in multi-story poultry houses and farm granaries.

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Farm Business Management — By Robertson and Woods. 1951. 546 pages, 248 illustrations. J. B. Lippincott. Prepared for use in all farm management and marketing courses. Combines the most up-to-date and authoritative content with the best farming practices available today in the field of farm management $3.80

The Hog Annual — Published by Farm Quarterly Magazine. March, 1952. Approximately 500 pages. First complete hog annual ever published. Contains names of all breed associations, secretaries, pig hatcheries, livestock yards, livestock commission salesmen, all of the hog farmers who sell over 400 hogs a year—fine articles on housing, sanitation, breeding and farrowing ...$5.00

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Financing the Farm Business — I. W. Duggan and Ralph U. Battles. Approximately 350 pages, illustrated. Published 1950. John Wiley & Sons. Here is the most practical and useful book on farm finance ever written. It tells the present or potential farmer how to get the credit he needs to lease, buy or operate a farm without burdening himself hopelessly with debt $3.00

Successful Broiler Growing — By Edmund Hoffmann. Has the answers to hundreds of questions which broiler growers ask $3.50

What's Coming in Farm Tractors?

Some of the rosy, wartime promises for the "tractor of the future" are now coming down to earth and materializing both in print and steel.

Fluid clutches, hydraulic torque converters and automatic transmissions will be among the biggest advancements in tractor design since the use of rubber tires, according to H. D. Bruhn, farm engineer at the University of Wisconsin. Proved in automotive engineering, they will contribute to ease of control, smooth operation, long life and simple construction.

Starting loads through a hydraulic coupling eliminates shock. It's impossible to kill the engine of the tractor. If a load is too heavy, the coupling slips and the operator has a chance to shift to a lower gear to start. Disadvantages may include higher fuel consumption on some loads and higher initial cost for the machine.

In Germany, H. Lanz Company has announced a new implement carrier type of tractor. Called the Lanz All-Dog, it has some features similar to both Allis-Chalmer's rear-engined Model G and Minneapolis-Moline's new Uni-Tractor. Its 16 h.p. diesel engine is mounted at the rear. One or more mounted implements can be carried on a long tubular frame. Two steering wheels, two power take-offs, five gear ratios, adjustable wheel tread and engine driven front wheel jacks are other features.